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# AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

**NEWS**

FEBRUARY 1992

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**R/C  
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**Super Tigre S45K**

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*Hobby Lobby Electro Jr.*

*Hobby Dynamics Sportee 40*

*Mini-Elite Rotor Head*

*Great Planes Fun One*

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**CONSTRUCTION:**

*Skyburner .60  
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# MODEL AIRPLANE

THE WORLD'S PREMIER R/C MODELING MAGAZINE

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**ON THE COVER:** center—a P-51D race plane, Cutter's Capers, banks hard while flying around a pylon at the '91 full-scale Reno Races. (Photo by Stephen Dunham.) Lower left: the flight line during the action at the '91 R/C Unlimited Races; Larry Skiles' no. 78 and Larry Sutherland's no. 90 can be seen just prior to a midair collision. (Photo by Rob Wood—see Showdown at Madera.)

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# EDITORIAL

T O M A T W O O D

## IN THE ELEMENTS



In the picture above, Sal DeFrancesco of Northeast Sailplane Products, launches an F4 (built by Bob Powers) into the air high above Cape Cod Bay (Bob, standing at right, kitbashed the sloper from a Royal power kit.) In the smaller picture, I'm piloting Bob's Chuperosa in a slow, top-of-the-slope flyby on the Atlantic side of the Cape. This was my first chance to fly an airplane on the slopes, thanks to *Model Airplane News* contributor David Garwood, who invited me and several others to a slope-soaring weekend on the Cape in mid-October.

The raw experience of coastal weather, plus the chance to fly R/C models without time limitation, was exhilarating. The winds ranged from an overcast, 15mph westerly that supported light ships (including my Electro Uhu, flight batteries removed) to a stiff, easterly wind averaging about 30mph (where I again flew the Uhu, batteries on board). The highlight was flying David's Bob Martin Coyote from a clifftop overlooking the whitecaps. Incredibly, only a few feet in front of the turbulence at the top of the cliff, there was a huge mass of smooth rising air extending from near-beach level to at least a couple of hundred feet above us. I highly recommend slope soaring if you haven't yet tried it.



PHOTO BY DAVID GARWOOD

### FORM FOLLOWS FUNCTION

Based on our survey and on comments offered over the last year, we've developed a new editorial design that will result in more useful information per issue. More kit reviews will be published each issue, and every review will include a flight-performance evaluation discussing takeoff and landing, high-speed performance, low-speed performance and aerobatics.

Perhaps it's just human psychology, but some continue to perpetuate the myth that all magazine reviews are somehow tainted by advertiser influence. This isn't

part of the landscape at *Model Airplane News*. Anyone who has any doubt is free to give me a call. In a critical review this issue, we pull no punches. Our reviewers serve as consultants to our readers—we would have it no other way.

We're increasing coverage of engines, flying techniques, building methods, model aircraft mechanics and design. For the newcomers, we'll continue broad coverage of the basics.

Starting this issue, you'll also see pictures at the top of columns. More enhancements will be coming in future issues!

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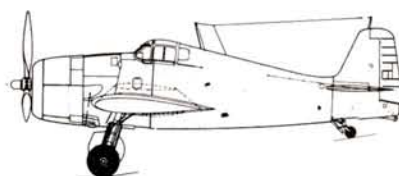
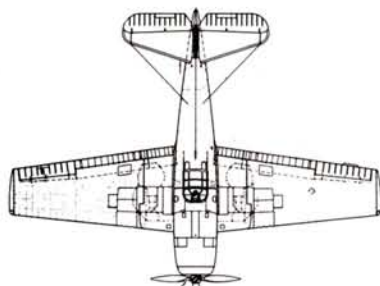
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# AIRWAVES



## HELLO HELLCAT

I'm very interested in building an F6F Hellcat, but I'm having trouble finding a kit. Do you know of any that would fly well on a hot .45 engine? Dynafite made such a kit, but they stopped making it about three years ago. I know that there must be more airplane kits than are listed in the Tower Hobbies catalogue. I've been able to find plans for the Hellcat, but I don't have the time or know-how to build from scratch. Please let me know if you know of any F6F Hellcat kits.

You have an excellent magazine. Keep up the good work. "Pilots' Projects" was a great addition to your magazine. I think that you should expand it and put the planes into categories (trainers, sport and scale).

DEAN WESTHOFF  
Lewistown, MT

Dean, the Grumman F6F Hellcat—a classic Navy fighter—is a popular model project, and many plans and kits have been marketed. Unfortunately, the only .40 kit was the old one by Jemco, and it's no longer being made. There's still a small chance that you could find one at a swap meet, or perhaps one of our readers has one. We'll pass any information along.

A slew of plans is available from a variety of sources, but most are .60 to .90 size (bigger flies better!). You could use these plans by sending them to one of the "We'll cut a kit from your plans" companies and ask them to custom-make a semi-kit for you. I recommend our own FSP-03772 (\$11.50; see the Plans Directory) and the one available from Bob Holman Plans. Why not order Bob's 64-inch-wingspan

Hellcat kit for \$189.95? It has an epoxy/glass fuselage, built-up wings, sanded ribs and machined parts. Bob can be reached at P.O. Box 741 San Bernadino, CA 92402; (714) 885-3959. Tell him we sent you! GY

## WANTS A WACO

I contacted the Waco Club in Hamilton, OH, to ask them about a Peter Westburg drawing of the Waco ATO Taperwing (I think, drawn in July, 1974), but with no luck; they're stumped. I hope you have information as to the availability of three-view drawings. I want to build a 2-inch scale ATO just for display purposes and plan to use dowels to build up the airframe, like real steel tube.

DAVID W. GALLAWAY  
Bremerton, WA

David, we do have a plan for an R/C model of the ATO Taperwing FSP-06761 (\$12; see our Plans Directory). It has a 48-inch wingspan and is 41 1/2 inches long. There's no mention about its scale, though. Also in our Directory are three-views by K. Wilson, but they're of a CTO Taperwing. The three-sheet plan sells for \$9. I hope this helps satisfy your Waco wishes. GY



## NAME THAT MODEL HELI

I'm trying to identify the "helicopter" in the enclosed photos and need your help. I'd appreciate any help with the identification, parts and manual availability; and was the K&B .35 with a 184 Tatone muffler (found with the craft) standard equipment? I'd like to restore it and return it to the air.

SGT. GILBERT SAMPALIA,  
USAF  
San Francisco, CA

Stan, this one's easy: it's an old GMP Cricket. The K&B .35 sounds like a good choice for the heli, and with the large cooling fins, it should work well. I don't think that the original Cricket kit included an engine, so any of several .25 to .35 en-



gines could be considered standard equipment. If I were to rebuild an old Cricket, I'd buy a new Enya .35 heli engine because they're popular, sweet-running powerplants. GMP went out of business some time ago, but its line of equipment and accessories has been taken over by Tech Specialties, 218 Vernon Rd., Greenville, PA 16125; (412) 588-1335. Call (ask for Bill Curtiss), or write to them. **GY**

## EDITORIAL VS. ADS

I got back into R/C three years ago after a 10-year lapse. I read *Model Airplane News* almost cover to cover every month. Two things I appreciate are the limited advertisements (unlike the other model magazine that spreads a one-page article across 15 pages of ads) and the high quality of the cover.

I have a request: could someone write an in-depth article on how to build canopies from sheet material? I'm a decent plans builder, but I detest working on the canopy/cockpit area owing to lack of experience and know-how. About sliding canopies: how are they built? I'd also like to see an article on how to build retractable landing gear (i.e., not on installing the purchased sets).

You people behind this magazine really do exemplary work; your pride in it is evident with every page turned.

**WARD KELLEY**  
Ludington, MI

*Ward, our publishing philosophy is to provide the best modeling coverage you can find anywhere. As our ad pages grow, we'll expand our editorial pages apace; we have no plans to cut up articles among many pages of ads as this magazine grows.*

*We have articles in the works on molding canopies from plastic sheet, making sliding canopies and, as a result of your letter, on landing gear. Thanks for the suggestions! We invite other readers to send us requests for specific articles as well. This is one of the best ways you can help us publish a better magazine.* **TA**

(Continued on page 10)

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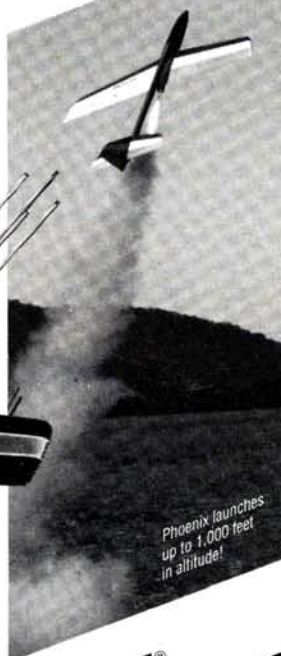
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# AIRWAVES

(Continued from page 9)

## HAPPY TRAILS

How do you get the trail of dense, cloud-white smoke mentioned in some of the smoke-system ads? I've noted with envy the photos of such R/C smoke systems, but fall far short of this with my systems, which utilize an extensive copper pre-heating coil with several coils inside the exhaust header. (I use a mix of diesel fuel and automatic transmission fluid.) The result: not much more smoke than would be generated by a rich engine needle-valve setting. I think the "secret" must be in the fluid. Can you help me on this?

JOHN A. CURTISS  
Tampa, FL

*John, the secret to a great smoke system isn't just the fuel mixture; it's also a matter of getting the smoke fluid to mist into the hottest part of the muffler, which is usually just beyond where the header is joined to the muffler. Get the smoke to mist by using some sort of nozzle or spray-bar mechanism (you can build this yourself, but test it) that will properly mist the smoke fluid. You'll need a good pump to deliver the fluid to the spray bar. One of the best sources of pumps that will handle any of the variety of smoke fluids is Varsane Products, 546 S. Pacific St., Suite C-101, San Marcos, CA 92069; (619) 591-4228.*

*Some local modelers with a lot of smoke-system experience note that a mixture of 60-percent diesel and 40-percent transmission fluid works well as a smoke fluid. Dan Santich uses a 50/50 mixture of diesel fuel and kerosene, but he also recommends the use of form-release oil, which is used when removing molds from concrete. (It can be obtained from contractor supply houses.) Rumor has it that paraffin can be used in smoke mixture, but we couldn't find any success stories. (If any readers have succeeded with this method, please drop us a line.) When you've succeeded in getting thick white smoke, send a letter and some pictures of your system. It might make a good how-to article!*

TA

## GROW YOUR OWN

I'm 15 years old and looking to get into R/C. To a newcomer like me and to many others, your magazine is very inspiring. I

have access to a few good reference books on every aspect of aircraft (except commercial). This easily accessible wealth of information raises my question. Can you construct a detailed set of plans from a three-view drawing? Is there a back issue you could recommend to me?

My father has been a professional cabinetmaker for about 20 years, and with his help, a scratch-built project should be relatively easy. I know you think I'm starting with something that I can't accomplish, but I plan to get an easy-to-fly trainer first. I hope you can help me.

PHILIP WARD  
Highgate, Ontario, Canada

*Philip, drawing construction plans from good three-view drawings is possible, and many modelers do it regularly. You'll need a few things to get you off on the right foot.*

*First, you'll need a complete set of plans, including top, side and front views. It also helps if the plans show some fuselage cross-sections to help you understand the plane's true shape. Next you'll need the wing root and tip airfoil sections. With these, you'll be able to duplicate a relatively simple wing layout. Enlarge these details on a copier machine to the size you want your model to be. By passing the drawing several times through the machine, you can easily obtain drawings for a 60-inch-span model.*

*With these enlargements under some drafting paper, redraw the plans and clean up the lines with a straightedge ruler and some French curves. When this has been finished, you'll have a full-size outline of your model. If the wing is straight or straight tapered, the airfoil cross-sections can be used as templates for cutting a foam wing. For the fuselage and tail section, you should look at as many model plans as you can to see how other designers arranged formers, stringers and other details. A local hobby shop or R/C club should be able to help you out here. Though a scratch-built project is more complicated and time-consuming than building a kit, it brings with it a satisfaction that's hard to describe. In the beginning, everyone scratch-builds! (Why not send for our new book, "Scratch Building R/C Airplanes" by Rich Uravitch, which is advertised elsewhere in this issue?)*

GY

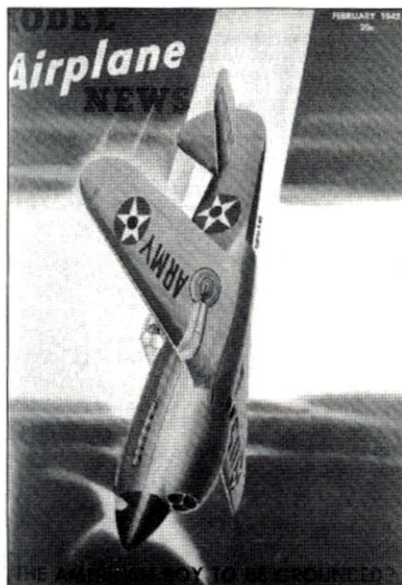
(Continued on page 53)



# FIFTY YEARS AGO

G E R R Y Y A R R I S H

## WE'RE IN IT NOW



"SO NOW WE'RE IN IT! So now the United States is fully embroiled in the greatest political, economic and military conflict in all of history." The first sentence in the article, "Air Fighters of the Setting Sun," by Larry McRoberts, described the U.S. entrance into WW II and set the tone for the February '42 issue of *Model Airplane News*.

With the sudden Japanese attack of

Pearl Harbor, the U.S. was plunged headlong into the battle. McRoberts's article painted a sobering picture of what was possibly to come in our war against Japan. The article was written with some anti-enemy propaganda; in those times, that wasn't uncommon. Japanese planes were thought to be nothing more than carbon copies of outdated Allied designs. Japan's limited resources and its relatively dated aircraft were thought to be its weak links, but the single-mindedness of the Japanese fliers and their belief that to die for the Emperor was to die with honor, were frightening realities. Any conflict with them would be a long and costly endeavor.

McRoberts's strongly patriotic, morale-boosting article ended with: "Most assuredly, it will be a long fight, a deadly, savage maelstrom of destruction that will cost each of us dearly. But, most assuredly, the spiritual force of liberty-loving peoples will crush forever the military powers of freedom's greatest enemies: Hitler, Mussolini and Tojo! VICTORY!"

### BOMBER BUSTER

Many U.S. warbirds weren't up to the task, so the military redesigned and modified its weapons to survive the ravages of war. One of those warbirds was the Curtiss P-

40. After many changes, the "F" model became known as "Uncle Sam's 400mph pursuit plane." (The production model fell slightly short of that speed.) *Model Airplane News* named the P-40F the "Bomber Buster," and its picture was on our cover that month.



*A flight of Mitsubishi Kinsei long-range bombers. At the time, Japanese bombers were thought to be just copies of other nations' aircraft.*

Capt. Claire Chennault and his Flying Tigers (the American Volunteer Group) flew the early P-40s over China and ensured their fame. With their Allison V-1710-C15 engines, these planes had a top speed of 330mph.

The 9,350-pound P-40F, which was 33 feet, 4 inches long and had a wingspan of 37 feet, 4 inches, was powered by a Packard-built, Rolls-Royce Merlin V-1647-II engine. It had a top speed of 364mph and a range of about 945 miles. It also had an increased fuel capacity and provisions for two 100-pound bombs (one under each wing). Every aspect of it had been improved. There were 1,311 of these models produced.

### THREE-VIEWS

The illustrations that you see here are the original P40-F three-views. Scale modelers might be inspired by them. If they are, we hope they'll let us know! ■

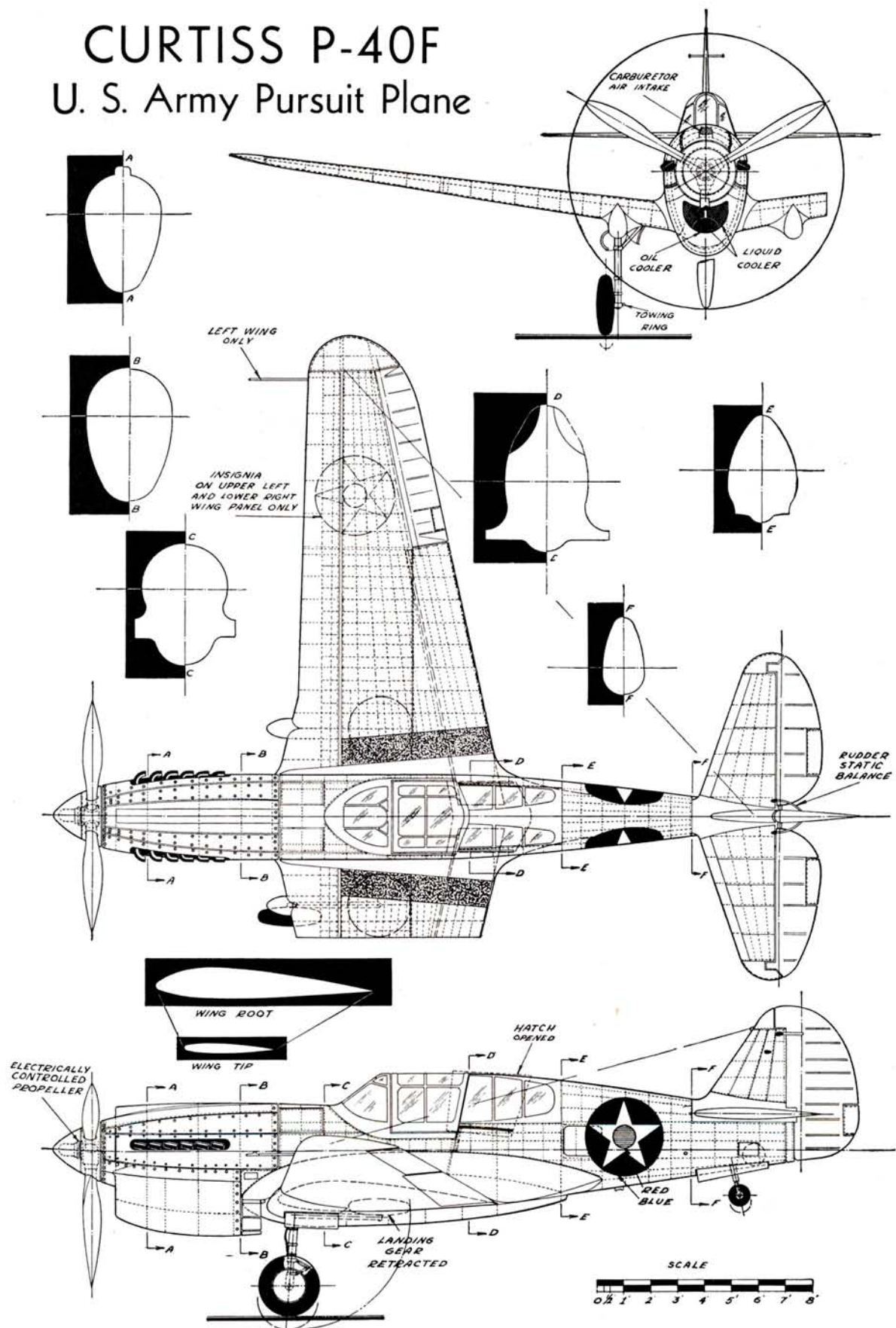


*The Curtiss P-40F, a much-improved version of the original design, had an extended range and increased power.*



# CURTISS P-40F

## U. S. Army Pursuit Plane



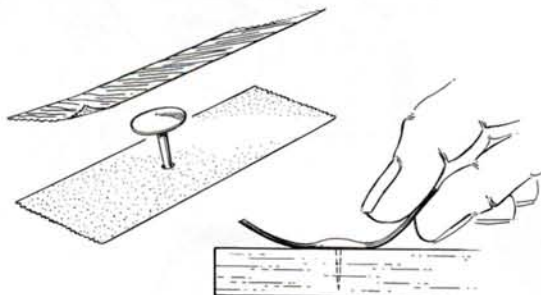


# HINTS & KINKS

J I M N E W M A N



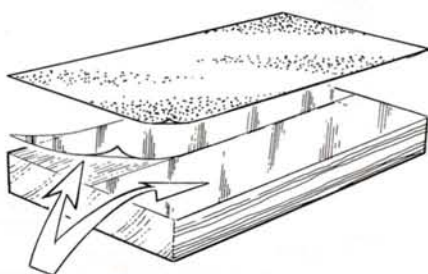
Model Airplane News will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send a rough sketch to Jim Newman c/o Model Airplane News, 251 Danbury Rd., Wilton, Ct 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO, AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we can't acknowledge each one, nor can we return unused material.



## THUMBTACK PULL TABS

If you find it difficult to take thumbtacks out of your building board, try this: sandwich the heads of the tacks between two strips of masking tape. To remove the tacks, just pull up the tape.

James L. Jones, Grandterrace, CA



## EASY SANDING BLOCK

Use double-stick carpet tape to stick sandpaper to your sanding blocks. It's easy to do, and there's no mess from spray adhesives.

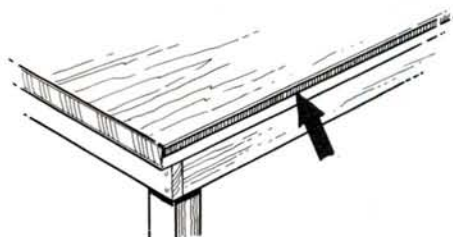
Larry Renger, Cerritos, CA

inches	approx metric
1/32	1 mm
1/16	1.5 mm
3/32	2.5 mm
1/8	3 mm
3/16	5 mm
1/4	6 mm
5/16	8 mm
3/8	9.5 mm
1/2	13 mm
1.0	25.4 mm

## DECIMAL EQUIVALENTS

Many of the products and plans now available are imported, so we're frequently faced with metric dimensions. Here's how to convert millimeters into inches: divide by 25.4. If you see a plane with a wingspan of 1,300mm, just divide the 1,300 by 25.4 and you'll find that the wingspan is a handy 51 inches (25.4mm equal 1 inch). To make it easy for you, the chart shows some handy conversions.

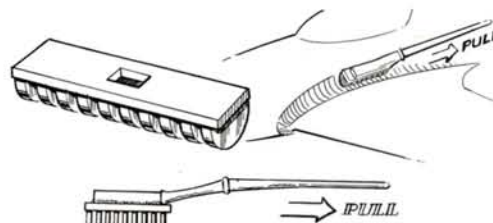
Lennart Kjaeboe, Morkved, Norway



## MAGNETIC CATCHER

The doors of discarded refrigerators can be sources of long magnetic strips. Glue one of these strips to the edge of your workbench. It will catch and hold steel screws, washers, nuts and ball bearings that might otherwise roll over the edge.

B.J. Potter, Tamworth, NSW, Australia



## FILLET CARVING TOOL

Save the vibrating cutter from inside your due-for-service Ronson, Braun or Remington shaver. Glued to a handle, e.g., one from a discarded toothbrush, it makes a fine scraper for forming wing fillets, etc. It's similar to the expensive tools used on gun stocks.

Jay Wallace, Ashland, OR



## DRY STORAGE FOR CA

Moisture is the catalyst that sets off CA, so this "dry" storage for your opened bottles will be useful. Electronics equipment sometimes comes with bags of silica-gel desiccant in the packaging; silica gel can also be obtained from chemical supply houses. Dry the desiccant for 3 to 4 hours in an oven set at 250 to 300 degrees. Put it into a clean, airtight, screw-top jar, then add your bottles of CA before closing the lid tightly. The desiccant will absorb any moisture in the jar and will extend the life of your CAs. As the desiccant absorbs moisture, it turns from blue to pink, but you can dry it and re-use it.

Eric Gustafson, Tucson, AZ



# AIR SCOOP

CHRIS CHIANELLI



*New products, or people behind the scenes—my sources have been put on alert to get the scoop! In this column, you'll find news that will, at times, cause consternation, and telepathic insults will probably be launched in my general direction! But who cares?—it's you, the reader, who matters most! I spy for those who fly!*

## SPECIAL "CHICAGO RCHTA SHOW" EDITION.

*The Radio Control Hobby Trade Association show held in Chicago featured the latest in R/C products.*

## High-Level Handshake



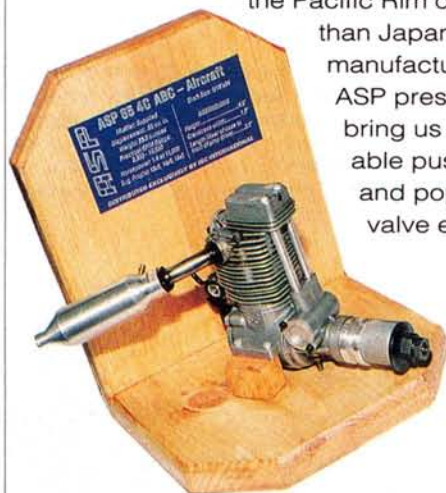
Apart from checking up on all the new products, my marching orders at "showtime" include maintaining "foreign policy"; somebody has to do it. When I met with Mr. Matsusaka (the president of Hirobo Limited), I told him that recent Hirobo product releases (distributed in this country by Altech Marketing, of Edison, NJ) demonstrated the company's commitment to bringing American helicopter fanatics high-quality, unique helicopters and accessories. He assured me that this policy would continue in the future. For example, the lovely Akiko Kimura holds Hirobo's Lama cockpit detail kit; it not only adds tremendous realism to the bubble cockpit, but the instrument panel can also be illuminated with a small bulb! Also shown is an engine and skid detail set that adds a dummy engine near the rotor head and skid wheels that make taxiing possible.



## ASP 4-STROKE

About six years ago, 4-stroke glow engines made a strong showing in the sports-flier arena; then the yen went nuts, and prices soared. Although it isn't yet available, this ASP .65 4-stroke engine may be a sign of more reasonably priced 4-bangers coming from places in the Pacific Rim other

than Japan. I hope manufacturers like ASP press on to bring us affordable pushrods and poppet-valve engines.



## REVOLUTIONARY RADIO?



Polk/AristoCraft claims that "the Valiant 8 R/C system is the ultimate answer to operating in the 1991 scenario as presented by the AMA guidelines." The system (3 years in the making) uses a Phase Loop Lock (PLL) circuit to provide 50 selectable channels in one radio system, without changing crystals. An American-made microchip controls the radio's PCM circuitry, and an American chip handles its RF section. "All 50 channels are perfectly tuned to a standard not yet achievable by any other maker, and our receiver leads with better than 88dB adjacent channel rejection," says Mr. Song, chief engineer. User-friendly software is programmed in-house and overseen by Polk's modeler and ace flier, Charlie Hampton. The features on this radio are far too numerous to mention here, but check this one out: when low receiver voltage is sensed, the throttle will fluctuate for several seconds to warn the flier that only a few minutes of battery life are left.



# AIR SCOOP



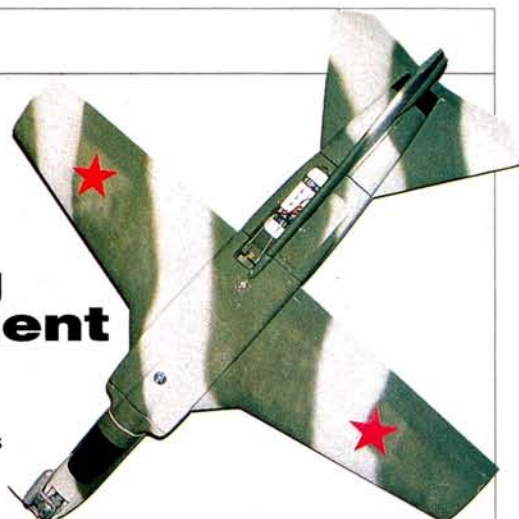
## Transroc II MODEL FINDER

Estes' new Transroc II Transmitting Locator is a model-tracking and finding system. The hand-held receiver (complete with compass and earphones) picks up the tone from a transmitter that's mounted in the model. Since the transmitter is small enough to use on model rockets, fitting it to the smallest of R/C airplanes should present little challenge. The signal is detectable up to 100 meters.



## Goldberg Government Contract

Carl Goldberg Models is the proud winner of a U.S. military contract. Goldberg now supplies the military with  $1/9$ -scale MiG 27 (Flogger) R/C target drones. These K&B .65-powered models are flown at bases where target and aircraft I.D. training take place. As you can see, the military specifications transmitter is very large and it



can operate for many more hours than a hobby unit. The radio is made for Goldberg by Ace R/C. These drones were used extensively in the Gulf War to keep gunners at their best. We'll have an in-depth feature on the Goldberg target MiGs soon.



## HOBBY LOBBY HUGHES

If you thought a photo of Bigfoot was rare, this shot has it beaten: the vice president and general manager of Hobby Lobby International, David J. Martin, overtaken by a serious moment—a rare event, indeed! David is very serious about Hobby Lobby's latest project—the Electric Hughes 500. This Ameri-

can-made model has a high-strength, high-density foam chassis that's laminated with phenolic; a non-collective aluminum rotor head; seven ball bearings; and a phenolic tail boom. The Electric Hughes is easy to fly and to repair. A sport helicopter that's designed for hours of outdoor or indoor fun, the Hughes



will hover at about  $1/2$  throttle; Hobby Lobby claims that when you increase throttle and lift away from hover, this heli will climb away faster than many glow-powered helis.

Flying time on a 1700 SCE pack is 5 to 7 minutes. Here's the best part: you can have it for \$189. If you want to see the Hughes perform before you buy it, order the video from Hobby Lobby for \$9, and then return it for a \$6 credit (or refund) after you've finished viewing it. I'm building the military version.



# AIR SCOOP



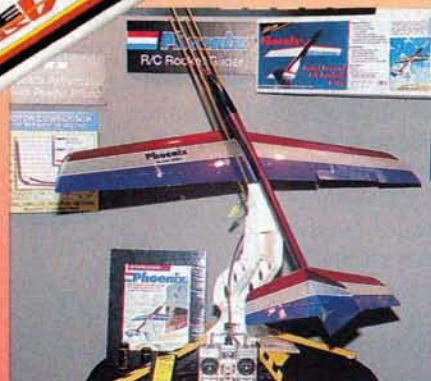
In the past, the use of rocket engines in R/C planes has been perceived by some to be a dubious practice. That notwithstanding, Estes and AeroTech have both introduced gliders that rocket to altitude, then stunt their way back to Earth. The canard is Estes' Astro

Blaster. It features an excellent glide ratio, is fully capable of loops, rolls and stalls, and is controlled by a 2-channel radio. The other is AeroTech's rocket-powered glider, the Phoenix. Like the Astro Blaster,

## R/C ROCKET POWER IS HERE



the Phoenix is fully aerobatic; it's allegedly capable of climbing 1,000 feet when used with AeroTech's solid-rocket engines.



## AIRTRAX .46



### THE BEST OF BOTH WORLDS

Normally, sport/pattern planes aren't high on my list of interesting things, but L&R's Airtrax .46 is an exception. The Airtrax series combines the slow-flight characteristics of constant-chord sticks and Top Flite Contenders with tracking qualities that are in line with today's pattern ships. This isn't just my opinion; it's the consensus of all Airtrax owners with whom I've spoken. It really is the best of both worlds. The design incorporates a double-taper, fully symmetrical airfoil. Whether it's used as an aileron trainer or by intermediate or expert fliers, the Airtrax is a winner. Like all L&R kits, the Airtrax .46 comes 75-percent jig-built. For more information, contact L&R Aircraft Ltd., 13645 Fisher Rd., Burton, OH 44021; (216) 834-1578.

## SHOWROBICS

Air Age Editor Gerry Yarrish tries to rally *Model Airplane News* Editor Tom "Flying Circus" Atwood and yours truly to do some pre-Chicago show aerobics. Gerry is very



serious about showtime exercise; too bad there are only three a year.



# SMALL STEPS

JOE WAGNER



## CG BALANCING ACT

DAVE LINEHAN, of Houston, TX, wrote to me recently about some problems he had had with a small R/C model. He eventually found their cause: *tail-heaviness*. As I've said here before, nose-heaviness is preferable to tail-heaviness—on any kind of aircraft. It's just so much easier to build a tail-heavy model than a properly balanced one!

Tails are longer than noses, and any weight that's far aft, e.g., a tail wheel, requires a great deal of mass near the nose to compensate for it. As we all know, lightness is essential to success with small R/C airplanes. It seems a shame to burden an

is excessive stability—or reduced maneuverability, if you prefer to think of it that way. A CG that's more than 33 percent chord is an invitation to doom.

The best way to keep your model's CG where it belongs is to plan ahead. As you build, do everything possible to avoid weight aft of the wing.

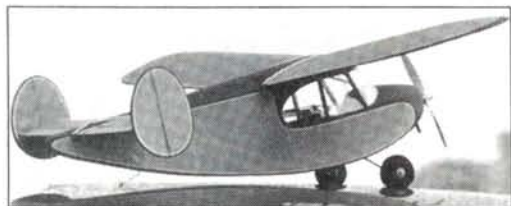
- **Lighten bulkheads.** Those in the fuselage rear carry practically no load anyway.
- **Build up tail surfaces.** If you *must* use sheet balsa, use "contest grade" wood, and don't add a lot of finish to it.
- **Put your equipment way up front.** Install lightweight pushrods, such as Su-Pr-Line's



*One way to fight tail-heaviness is to stretch out the nose, as shown on this Ace R/C Wizzard.*

nyrods. They're harder to install, but dual cable control (the pull/pull system) is the lightest possible method of actuating rudders and elevators.

If you just have to build a short-nosed subject, you can cheat the laws of aerodynamics with a trick that free-flighters have been using for decades: employ a "lifting tail." FF airplanes fly quite successfully, and at high power, too, with CGs as far aft as the wing's trailing edge! This is done by making the tail plane carry some of the

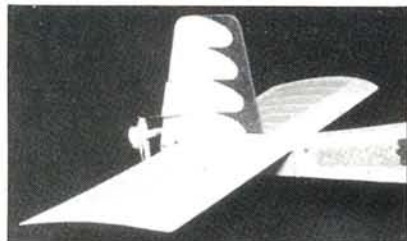


*Another cure for tail-heaviness: make the fuselage short and sweet. This Tin Lizzie shows how.*

airplane with ballast up front, merely to bring its balance point a shade forward.

Yet, even high wing loading is preferable to tail-heaviness! A heavy airplane may land hard, but a lighter one with its CG too far aft will crash even harder.

Where should an R/C model be balanced? That depends on several factors, e.g., the amount of decalage and the airfoil shape, but for airplanes of conventional configuration the best range is from 25 percent to 33 percent of the average wing chord aft of the leading edge. A CG of less than 25 percent isn't so bad; its main effect



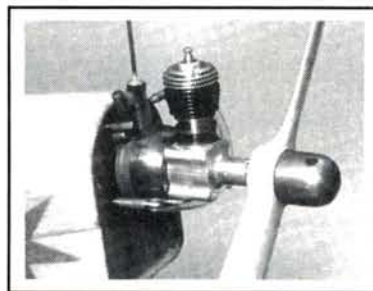
*Lifting-type stabilizers are standard on free-flight models; they can help in R/C too, as an antidote to tail-heaviness.*

## A WEIGHTY MATTER

**D**espite our best efforts, we sometimes finish a brand new R/C model, then discover that it balances at around mid-chord of the wing. If, after shifting the receiver batteries as far forward as they can go, our airplane still hangs tail-low when we support it with our fingertips at the one-third chord position—what will we do now?

Assuming that there's no practical way to remove weight from the tail, the only alternative is to add mass to the nose. The farther forward we can put it, the less we'll need. A solid metal spinner is a good way to accomplish this. For an engine such as a 1/2A that has its propeller retained by a screw, making a solid spinner is easy.

Drill a suitable piece of round bar stock and tap it on center with threads of the same size as those on the engine's prop-retaining screw, then install a headless screw in the hole. The protruding end of this screw can be chucked in a lathe or drill press for shaping the outer contour of the solid "spinner" with lathe tools or a file.



*There's no better way to add nose ballast than by adding a solid steel prop spinner, such as the one on this much-modified Cox Pee Wee.*



rearward weight. In effect, a model with a lifting airfoil in its stabilizer is a sort of hybrid biplane. Part of the stabilizer acts as a wing, and the other part keeps the "main wing's" angle of attack from varying excessively.

Lifting tails are larger than the usual kind (the area that does the lifting is extra), but the increase in size doesn't have to look extreme. As fliers of rubber-powered scale models



*This Flyline Curtiss Robin, built by Emmett Fry of Little Rock, AR, is a perfect example of a well-balanced R/C model. Its long nose and built-up aft portion are the way to go.*

well know, if you keep the relative shape and proportions of an enlarged surface the same as the full-size prototype's, the enlargement isn't blatant.

For sport-flying R/C types, a lifting tail has a benefit, beside permitting a safe aft CG position: it provides automatic longitudinal trim. How? When engine power is increased on an airplane with flat tail surfaces, the resulting higher speed generates added wing lift and drag—both of which produce a nosing-up tendency on a typical light plane configuration. But with a lifting tail, extra speed makes the stabilizer's lift increase in the same proportion as the wing's did. Since the tail has a long "lever arm," the stabilizer's added lift easily overcomes the wing's nosing-up tendency and maintains level flight. Of course, the same action takes place in reverse when engine power is reduced, so a lifting tail performs a double-duty job of stabilization. ■



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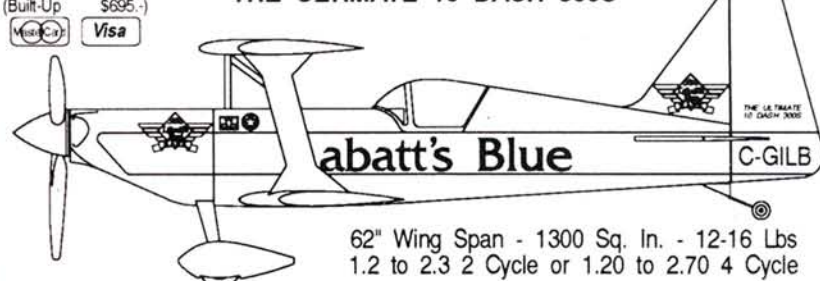
1/8" x 12" x 35" - Stock #6652

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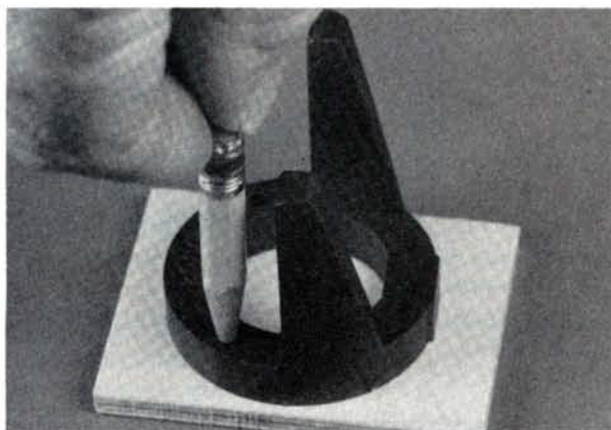
# How To:



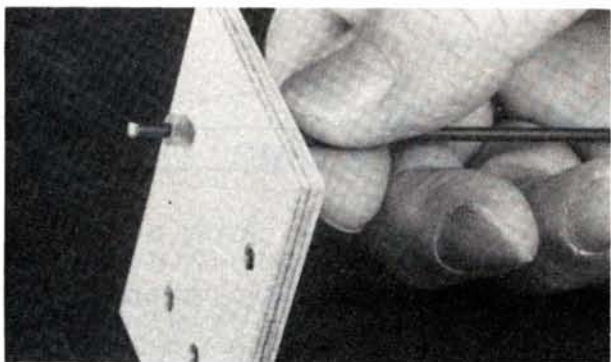
R A N D Y   R A N D O L P H

## EASY SHOCK MOUNTS

*Vibration has always been a problem with R/C models—especially those with large engines. Shock mounts are designed to reduce vibration, and though they aren't essential for smaller engines, they make for smoother, quieter running. This simple installation method can be quite effective.*



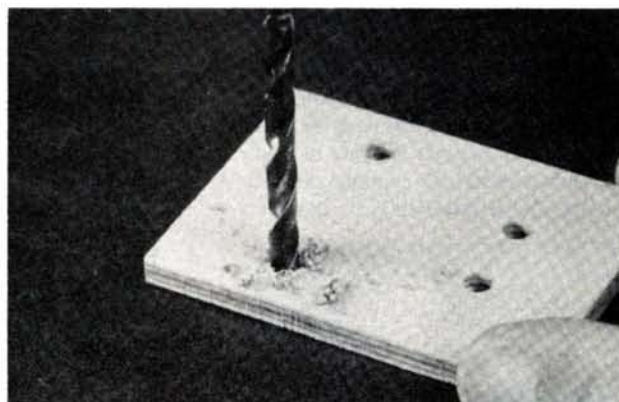
**1.** As with the installation of any engine mount, mark the positions of the mounting holes on the firewall. (To ensure accuracy, hold your pencil as near to vertical as possible.)



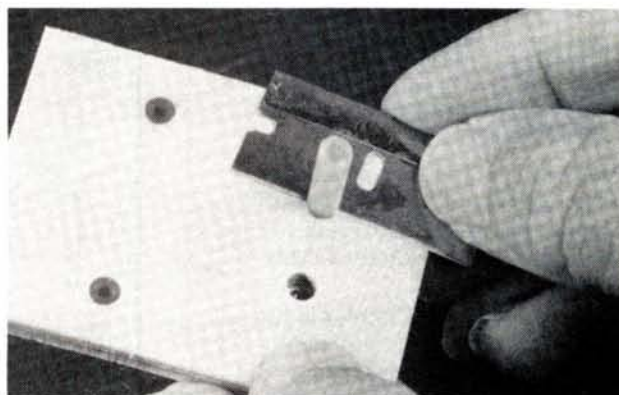
**3.** Slip  $\frac{1}{2}$ -inch pieces of fuel tubing through the holes. Use thin tubing for the  $\frac{3}{16}$ -inch holes and medium tubing for the larger ones. (It helps if you first slide the tubing onto wire of the proper diameter.)



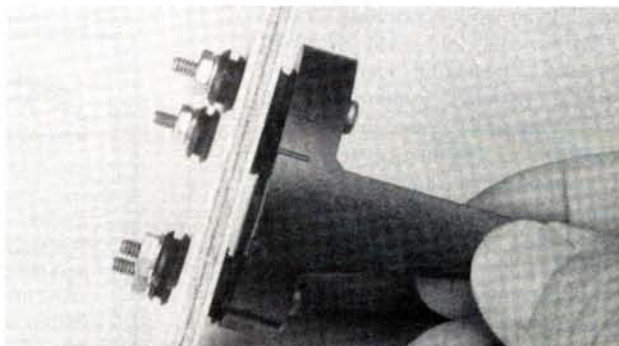
**5.** To install the mount, run each bolt through a hole, then through a rubber grommet, then through the firewall, another grommet and a washer and then the nut. Use washers of the proper size and grommets that fit the bolts snugly.



**2.** Drill the firewall at the marks. For mounts that take 4-40 bolts, drill  $\frac{3}{16}$ -inch holes; for larger mounts that take 6-32 bolts, drill  $\frac{1}{4}$ -inch holes.



**4.** Trim the tubing flush with both sides of the firewall. A single-edge razor blade is the best tool for this job, and there's no need to glue the tubing in place.



**6.** Tighten the nuts until the grommets are compressed, but the groove isn't closed. If you don't use locknuts, secure the nuts with a drop of Loctite's thread-locking compound.



# PILOT PROJECTS

## A LOOK AT WHAT OUR READERS ARE DOING

### SEND IN YOUR SNAPSHOTS

MAN is your magazine and, as always, we encourage reader participation. In "Pilot Projects," we feature pictures from you—our readers. Both color slides and color prints are acceptable.

All photos used in this section will be eligible for a grand prize of \$500, to be awarded at the end of 1991. The winner will be chosen from all entries published, so get a photo or two, plus a brief description, and send them in!

Send those pictures to:

Pilot Projects, Model Airplane News, 251 Danbury Rd., Wilton, CT 06897.



### BANGE'S BIPE

Fred Bange of Briarcliff, NY, scratch-built this beautiful E.A.A. biplane in 1/4 scale from the original EAA (Experimental Aircraft Association) three-views. The model has a wingspan of 70 inches; it's made out of balsa and plywood; and it's covered with Sig's Koverall. Finished with Sig dopes, it uses a Dural aluminum landing gear and has a built-up wooden cowl. It's powered by a Webra .91 with a modified Slim Line muffler, and it uses an Ace R/C radio. Its plug-in, detachable wings make it easy to transport.

### A KRIER CHIPMUNK

Keith Walker of Charleston, IL, built this beautiful Chipmunk from a Carl Goldberg kit. Keith had seen Harold Krier's full-size plane at a local airport, and he used this color scheme for his model. The finish is MonoKote with MonoKote trim. The Chipmunk is powered by an O.S. 91 Surpass that's mounted with a rubber, vibration-isolating engine mount and spins a Graupner 12x8, three-blade propeller and a True Turn spinner. The model uses flaps and mechanical retracts, and if it flies as well as it looks, Keith should have a winner.



### AWESOME AG-CAT

Built from Floyd Fitzgerald plans, this totally functional agricultural crop duster is the work of Dave Dedul of Alta, Canada. The 1/5-scale model weighs 14 pounds ready to fly. Built out of spruce and balsa, the model is covered with Coverite and is finished with dope. An O.S. 91 4-stroke turning a 14x6 prop powers it, and a Futaba FM G-series keeps it under control. The top wing spans 90 inches, and the bottom wing has a span of 85 inches. The model also has functional flying wires and an operating hopper/spreader that holds a 1-pound biodegradable mixture of bran and powdered sugar. According to Dave's flying buddy (who just happens to pilot a full-sized Ag-Cat), the model looks very realistic in the air.



# PILOT PROJECTS

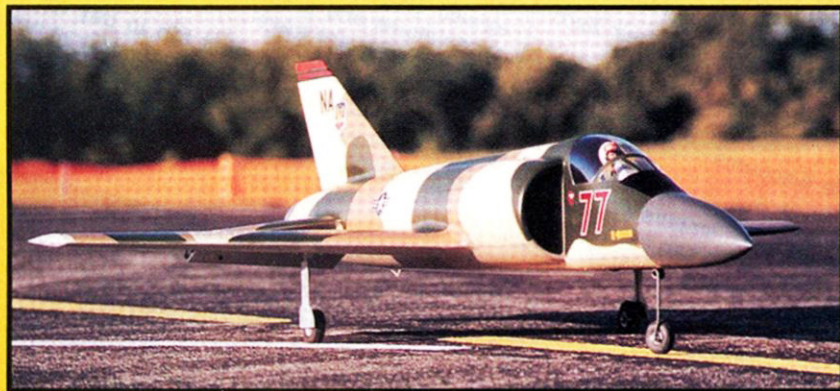


## FIRST PROJECT

Milton O'Bryant of Midland, TX, sent us these photos of his children's first airplane project. Twelve-year-old Vanessa and nine-year-old Matthew built this stock Guillow B-25 Mitchell kit. They covered it with tissue and finished it with three coats of clear dope and a finishing coat of Testor's silver spray paint. These youngsters did a great job! We hope Vanessa and Matthew will enjoy their new hobby for many years to come.

## AIRACOBRA IN GERMANY

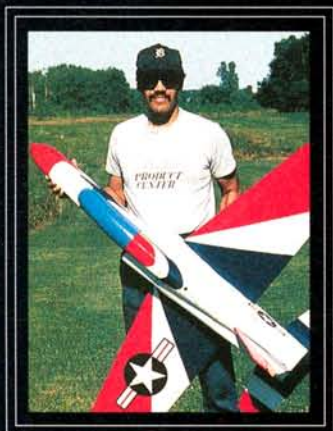
This lethal-looking P-39Q was built from a Kront kit by Ilja Czajka of Hustadtring, Germany. It has a wingspan of 81½ inches; it weighs 17 pounds; and it's powered by a Moki .25 engine (a Super Tigre S2000 is shown). The model includes flaps and retracts, and it has a fiberglass fuselage, a foam wing and foam stab cores. Ilja proudly told us that his model was displayed in the Inter-Modell Dortmund '91 Model Expo.



## TACTICAL STARFIRE

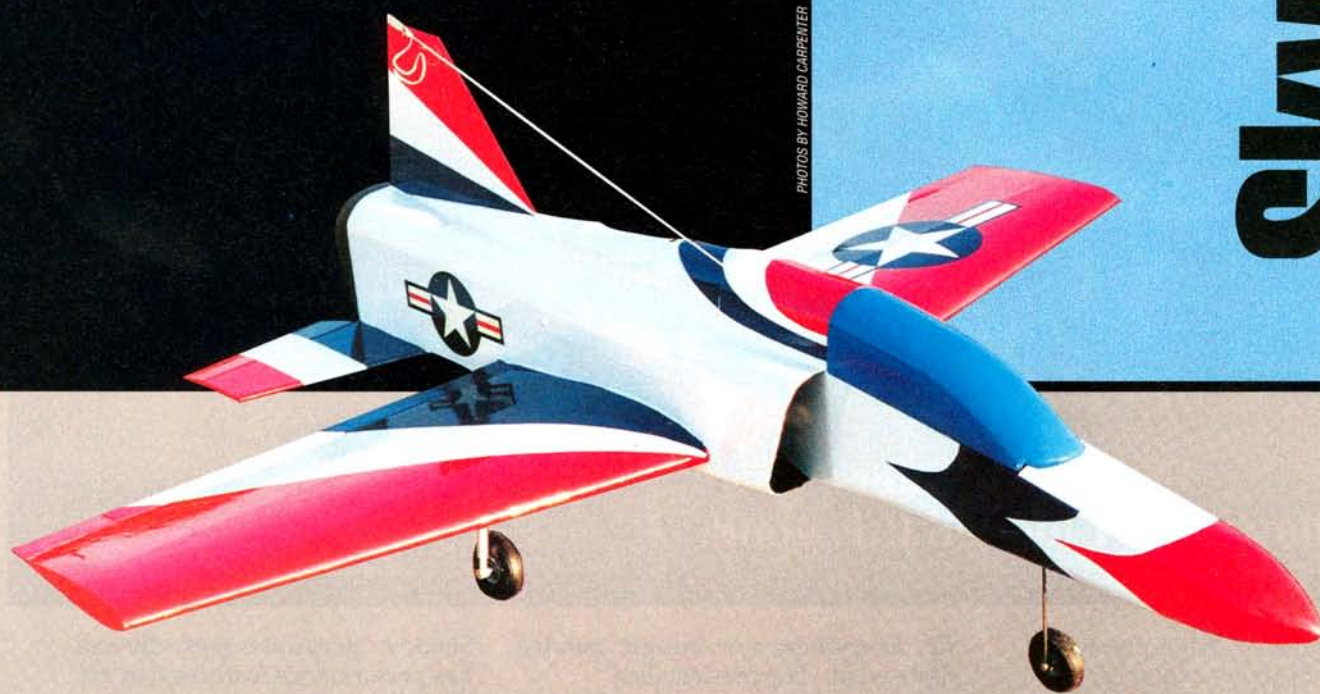
Built by Gary Fox of Overland Park, KS, this Jet Model Products Starfire is his first ducted-fan model. He finished it in the Soviet colors of the Tactical Air Command's Aggressor squadron. Powered by an O.S. .91 D.F. engine that's coupled to a Dynamax fan and a JMP quiet pipe, the model also includes flaps, retracts and in-flight fuel-mixture control. Tom Cook, who helped Gary with the construction, made the first test flight. Starfire no. 2 is now under construction in Gary's hangar.





by HOWARD CARPENTER

PHOTOS BY HOWARD CARPENTER



# Skyburner .60

**A** NYBODY interested in building a good-looking, great-flying, inexpensive ducted-fan jet that will make the prop jobs that your friends fly seem as if they're standing still? If so, read on!

The Skyburner .60 is an entry-level, ducted-fan jet that you can fly from almost any grass field. You can build it us-

ing readily available materials for less than \$100, including covering, hardware and fixed landing gear (engine, fan and radio are extra, of course). This design is docile enough to be flown by intermediate pilots, yet it's fully aerobatic and can turn and burn at more than 100mph on just a .60 engine.

**O U T T A S I G H T !**



# MATERIALS

## FOAM

- One 2x24x48-inch piece of 1-pound-density white for the wing cores.
- One 2x24x24-inch piece of 2-pound-density blue for the exhaust faring, the canopy plug and the intakes.

## PLYWOOD

- One 1/8x12x36-inch piece of aircraft-grade hardwood for the fuselage formers.
- One 1/4x6x12-inch piece of aircraft-grade hardwood for the fixed main-gear mount, the servo mounts and the fan mounts.
- One 24x48-inch piece of .007- to .010-inch-thick Lexan for the thrust tube. (It makes two.)

## BALSA SHEET STOCK

- Three 1/8x6x36-inch pieces of medium-hard balsa for the forward and the rear fuselage sides.
- Three 1/8x4x48-inch pieces for the top and bottom fuselage sheeting.
- One 3/8x4x30-inch piece for the top block of the forward fuselage nose.
- Two 1/4x6x36-inch pieces of hard balsa sheet for the horizontal and vertical stabilizers.
- Fourteen 1/16x4x30-inch pieces for the wing and the turtle-deck sheeting.

## BALSA TRIANGLE STOCK

- Three 1x1x36-inch pieces of fuselage corner filler stock.
- Two 1/4x1/4x36-inch pieces for the turtle-deck corner filler material.
- Two 1/2x1/2x36-inch for the forward fuselage top bracing.

## BALSA STICKS AND BLOCKS

- Two 1x3/4x30-inch pieces for wing leading-edge material.
- Two 1/2x3/4x30-inch pieces for wing trailing-edge material.
- Two 1/4x1 1/2x36-inch pieces of tapered aileron stock for ailerons.
- Two 1 1/2x1 1/2x8-inch pieces the wing-tip blocks.

## MISCELLANEOUS

- Two 36-inch-long pieces of 5/32-inch-diameter music wire for the main landing gear.
- Two 1-square-yard pieces of fiberglass cloth (one 3/4-ounce cloth and the other 4-ounce cloth).

## CONSTRUCTION

Start with the rear fuselage section. Notch the sides to accept the stub spars on F5 and F6. On each side, glue 1x1-inch balsa triangle to the top inside edge and the bottom inside edge from F4 forward. Use glue that can be sanded, e.g., Tite Bond, because you'll have to carve and sand this area later. Be sure to make a left and a right side.

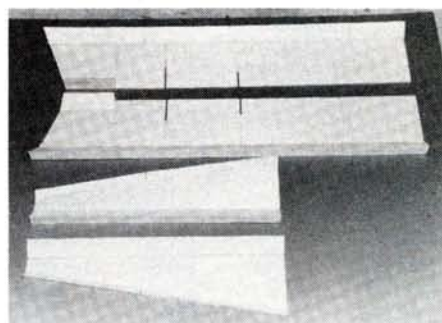
On a flat building surface, roll out the plans, and cover the top view with waxed paper. On the plans, frame the rear fuselage by using 5-minute epoxy to glue F4 and F8 to the sides. (It's important to maintain alignment of this assembly while the epoxy cures.) Next, epoxy F5, F6 and F7 into this box using the plans to establish position and alignment.

Use hard, 1/8-inch balsa and glue that can be sanded to sheet the top and bottom from F4 forward. Use 1/8-inch balsa to sheet 3 or 4 inches of the bottom of the fuselage just forward of the horizontal stabilizer so that the rear fuselage sits level on a flat surface.

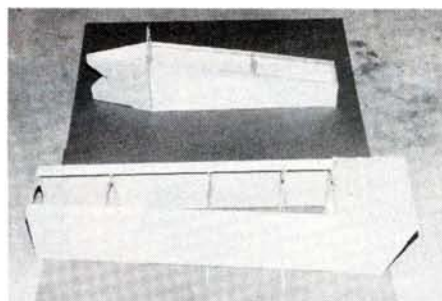
Set the rear fuselage aside, and begin the construction of the nose section. Glue 1x1-inch balsa triangle to the bottom inside edge of each side with glue that can be sanded. Again, be sure to make a left and a right side. Glue 1/2x1/2-inch balsa triangle to the top inside edge of each side. Then, working on the plan, epoxy F1 and F3 to the sides, creating another box. Next, epoxy F2 in place.

Use hard, 1/8-inch-thick balsa sheet to make the splitter plate, and epoxy it to the rear of the nose section. Add the 1-inch triangle balsa filler, and sheet the bottom of the nose section with 1/8-inch balsa.

# Skyburner



Here are the fuselage and nose-section sides with the triangle stock added. The sides have marks for the former locations, and they're slotted to accept the stub spars.



The framed nose and fuselage sections. Note that the splitter plate is attached to the rear of the nose section.

Trial-fit the nose and the rear fuselage sections together using the plans for alignment. The splitter plate should slide between the top and bottom sheeting of the rear fuselage section with the top sheeting of this section stopping against F3. Mark the outline of the splitter plate on the inside of the top and bottom sheeting of the rear fuselage. Separate the two fuselage sections.

## SPECIFICATIONS

**Type:** ducted-fan sport plane

**Wingspan:** 56 inches

**Average wing chord:** 11 inches

**Length:** 54 inches

**Weight:** 9.5 pounds

**Power req'd:** any .60 to .90 rear-intake, rear-exhaust engine and a Dynamax fan

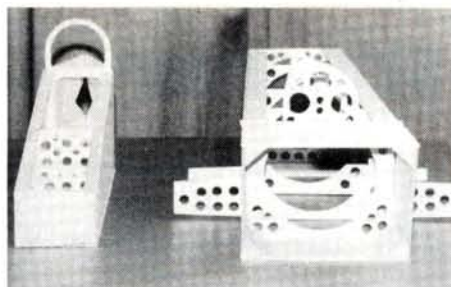
**No. of channels req'd:** 4 (elevator, nose gear, throttle, ailerons)

**Features:** an inexpensive, entry-level, ducted-fan model that can be built with readily available materials for less than \$100, i.e., without engine, fan and radio, and using fixed landing gear. (For more information on retract installation, see "Retracts Made Easy" in this issue.) The Skyburner uses sheeted foam wings and any of several engines.

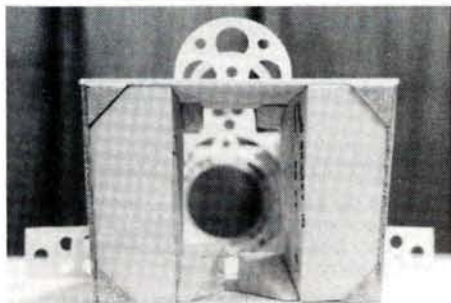
**Comments:** Depending on how you configure the model, you can have a docile ducted-fan sport plane or a screamer with unlimited vertical performance. The plane can be flown from almost any grass field.



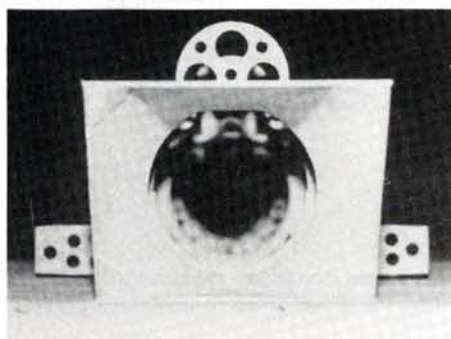




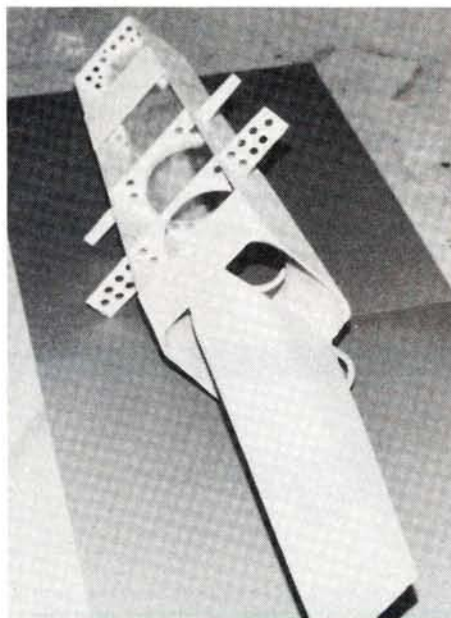
*A front view of the nose and fuselage sections.*



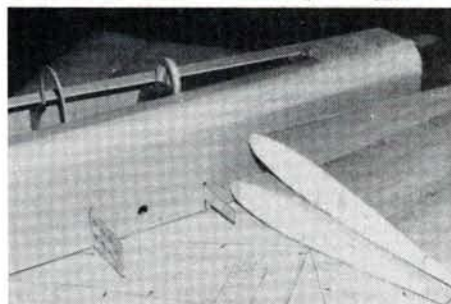
*The fuselage section with foam blocks before the air inlets have been shaped.*



*The fuselage section with shaped inlets. Shape them before you join them to the nose section. These inlets can withstand fan suction.*



*In this bottom view of the fuselage, you can see how the nose and the air inlets have been rounded forward of F4.*



*Cut slots in the wing cores to accept the stub spars, and then sheet them and drill the holes for the aileron servo leads before you join them to the fuselage.*

The secret to good ducted-fan performance is the size and shape of the air intakes. The Skyburner develops impressive thrust because its intake system is designed with a full splitter plate and contoured intake tracts. The intakes are easy to make. Glue 2-inch-thick foam blocks to the insides of the rear fuselage section from F4 forward. Cut smaller blocks to fill the area out to where you marked the outline of the splitter plate on the top and bottom sheeting. Using a coarse wood file and sandpaper, file and then sand to form the foam from F4 out to the front of each intake. Don't worry about the exact shape—a nice, smooth, flowing form that “blends” from the face of F4 to the front edge of the intake will do the trick. Now use slow-set epoxy (thinned to brushing consistency with rubbing alcohol) and  $\frac{3}{4}$ -ounce glass-cloth to finish and protect the foam. Sand it, and add another coat of epoxy so that the intakes are nice and smooth inside.

Back on the flat building surface, use 5-minute epoxy to glue the nose section to the rear fuselage. (Do it on the plans because alignment is important!) Face F4-A and F6-A with  $\frac{1}{8}$ -inch balsa, and glue the balsa side of F4-A to F4 and the balsa side of F6-A to F6. The balsa facing is where the razor-saw blade will pass through when you cut out the engine-compartment access hatch. Sheet the top of the rear fuselage with  $\frac{1}{8}$ -inch balsa.

## “The mother of all leaf blowers”

Now the fuselage looks like a couple of odd-shaped boxes glued together. With some elbow grease, you'll have to create the large radiuses that give the Skyburner its pleasing lines. Use the plans to make a radius template on a piece of thin plywood or balsa. With a coarse wood file or rasp, roughen the upper corners of the rear fuselage and the bottom corners of the nose section and the intakes. Fade the radius out at the bottom of the splitter plate, just forward of the bottom sheeting on the rear fuselage. After roughening these areas, sand them smooth.

Epoxy the tuned-pipe mounting block to the front of F7 against the top sheeting. This block mustn't obstruct the thrust-tube hole in F7; relieve it as required.

Cut out and trial-fit the thrust tube. It should run from 1.5 inches forward of F6 to 3 inches aft of F8. (I like to use a .010-inch-thick Lexan sheet of thrust-tube material.) Roughen the Lexan on the outside with coarse sandpaper so that you can use epoxy when you glue it to the formers. (Lexan sheet and special glues that enable you to glue Lexan to Lexan are available at plastic supply outlets.) Position and glue the thrust tube to F6, F7 and F8 with 5-minute epoxy. Drill and tap the tuned-pipe mounting block all the way through to the inside of the thrust tube with an 8-32 screw. Sheet the turtle deck from F3 to F7. Epoxy the horizontal and vertical stabilizers in place, and add the filler blocks to each side of the vertical stab.

Cut out the engine-compartment access hatch with a razor saw. Make sure you don't cut the thrust tube when you cut near F6. (I secured the hatch with four  $\frac{1}{4} \times \frac{1}{2} \times 1$ -inch hardwood blocks into which I had drilled and tapped holes to accept 8-32 nylon bolts.) Cover the inside of the hatch with  $\frac{3}{4}$ -ounce glass-cloth and epoxy for extra strength.

Cut the wing cores from 2-inch-thick white foam (available at lumber yards). Slot the cores to accept the stub spars on F5 and F6. Before sheeting them, trial-fit the cores by sliding them onto the stub spars and against the fuselage sides. Sheet the cores with  $\frac{1}{16}$ -inch balsa, then add the leading- and trailing-edge blocks and the wing-tip blocks, and shape them to blend with the wing form. Shape the leading edge with as large a radius as possible so that the plane will be able to make the transition from level to up or down flight smoothly. Cut a hole in each wing from the root (about halfway between the stub-spar slots) to the aileron-servo location. (I used a 12-inch piece of  $\frac{5}{8}$ -inch diameter brass tube with teeth filed on one end of it to make these holes.) Cut matching holes in the fuselage sides for the aileron-servo leads. Use 5-minute epoxy to glue the wings to the fuselage and the stub spars to each side with zero incidence and zero dihedral relative to the fuselage bottom. [Editor's notes: if you don't have the desire or the equipment to cut your own foam-core wings, Wing Mfg. can cut a set for you—you only have to supply root- and tip-rib outlines. For more information, contact Wing Mfg., Galesburg, IL 61401; (309) 342-3009.]

Inside the fuselage, install the  $\frac{1}{4}$ -inch plywood fan mounts and trial-fit the fan unit. The fan shroud should fit  $\frac{1}{16}$ -inch to  $\frac{1}{8}$ -inch into the hole in F4. (I used 6-32 blind-mounting nuts and 6-32 Allen-head bolts to hold the fan in place.)



If you're using fixed landing gear, epoxy the  $\frac{1}{4}$ -inch plywood main-gear mount to the fuselage bottom. Sheet the rest of the fuselage bottom (cross-grain) with  $\frac{1}{8}$ -inch balsa. If you're installing retractable gear, epoxy the mounting rails in the wings as shown. With fixed gear, the airplane will require at least 3 degrees of positive incidence when setting on the wheels; with retractable gear, it will require 4 degrees.

Back inside the fuselage, fuelproof the entire engine/fan compartment and the fuel-tank compartment above the splitter plate and inside the forward fuselage from F2 back to the inside of the splitter plate. (I used one coat of thinned epoxy for this.)

Use a Sullivan\* 2-ounce oval tank for the surge tank, and put it in the engine compartment behind the fan on the same side as the carburetor needle-valve fuel pickup. Connect the fuel line so that the clunk feeds the needle valve and the vent draws from the fuel pickup of the main tank. Connect the vent of the main tank to the pressure fitting on the tuned pipe. The main tank is a Sullivan 14-ounce slant tank.

Cut a half diameter of thrust tube material that's long enough to fit from  $\frac{1}{2}$ -inch in front of F5 to 1 inch inside the main thrust tube. This material will be the lower, extended portion of the thrust tube. Epoxy it in place.

Re-install the fan, and cut another piece of thrust-tube material to make the upper, removable portion of the thrust tube. This will include the engine-cover cap. You can make this cap by shaping a plug from foam, and then laminating it with three layers of 4-ounce glass-cloth and epoxy, or you can buy one from Jet Model Products\*. (To make the cover easy to remove, I used strips of Velcro® to secure it to the lower, extended portion of the thrust tube and the fan shroud.)

Install the radio, and position the servos according to the plans. The optional location for the elevator servo will require an Ace\* Noise Trap on the long extension as will the aileron servos. Use the optional location for the elevator servo if you're using retractable landing gear or an engine that's larger than .61ci. This location provides a much stiffer linkage from the servo to the elevator.

The aileron throw should be  $\frac{3}{8}$ -inch up and  $\frac{3}{8}$ -inch down; the elevator throw,  $\frac{5}{8}$ -inch up and  $\frac{5}{8}$ -inch down. Install the receiver behind the main fuel tank. If you're using fixed landing gear, put the battery near the nose cone to help balance the plane. Two notes of caution: loosely wrap a lot of foam around the receiver and the battery to protect them from vibration, and be sure to anchor the servo leads so that they don't touch the fan screws or other metal hardware inside the plane.

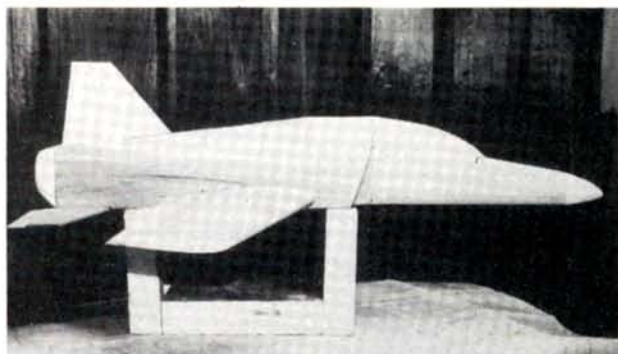
## THE FINAL TOUCHES

Although it's best to use MonoKote\* or some other lightweight iron-on covering to finish the airplane, the airframe can take any model-airplane finish.

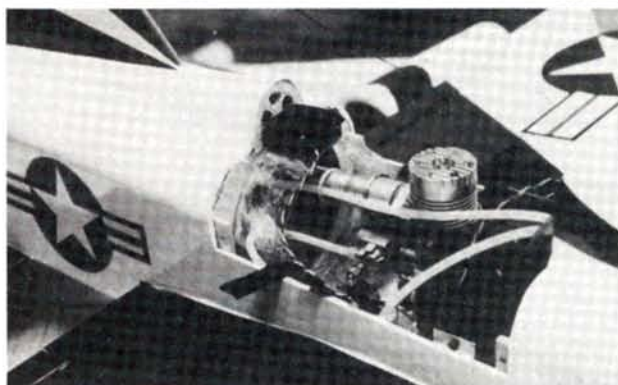
To make the canopy, shape a plug from foam, and then make a laminate of glass-cloth and epoxy. Use three layers of 4-ounce cloth, and one layer of  $\frac{3}{4}$ -ounce cloth. When it has cured, remove the foam, and paint it. (I hinged the canopy on one side, and I hook a rubber band to it and the fuselage bottom to secure it during flight.)

Shape the exhaust cone from 2-inch-thick blue insulation foam, and epoxy it to F8 and the end of the thrust tube. Use adhesive-backed MonoKote or paint to cover it.

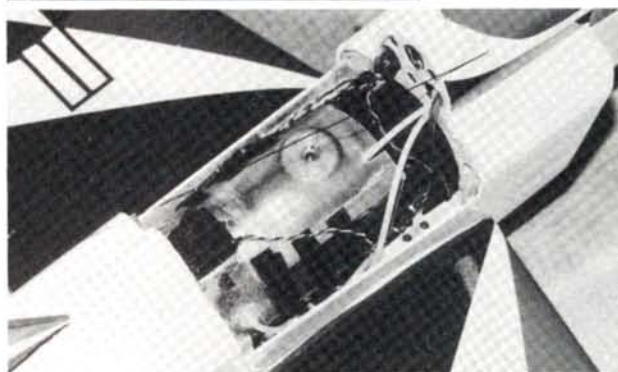
*The Skyburner ready to cover with the exhaust faring, the canopy and the foam plugs for the nose cone tack-glued in place.*



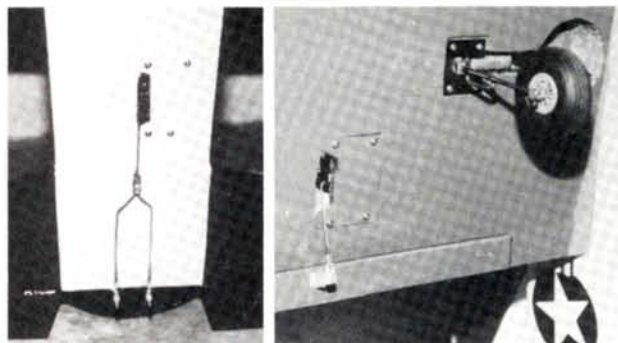
*The engine bay provides access to the engine, the fan and the throttle servo. Double the thrust tube under the throttle servo then glue it in place with silicone glue. A thick fillet of silicone will prevent the tube from cracking where it exits F6.*



*In this view of the engine bay, the upper thrust-tube section (including the engine cover cap) are in place. Use Velcro® to attach this assembly to the lower, extended part of the thrust tube.*

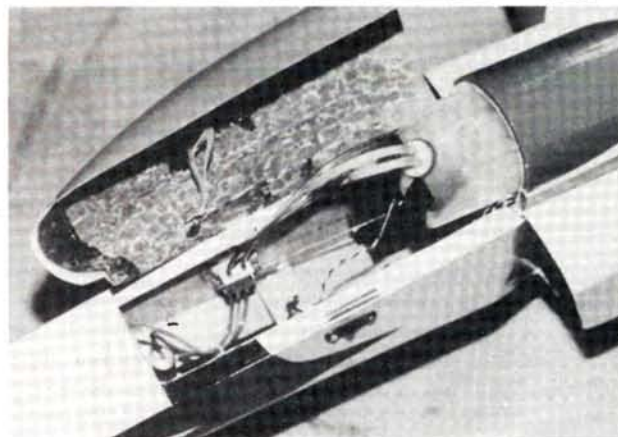


*Right: The split elevator pushrod is made from two 2-56 pushrods soldered together.*

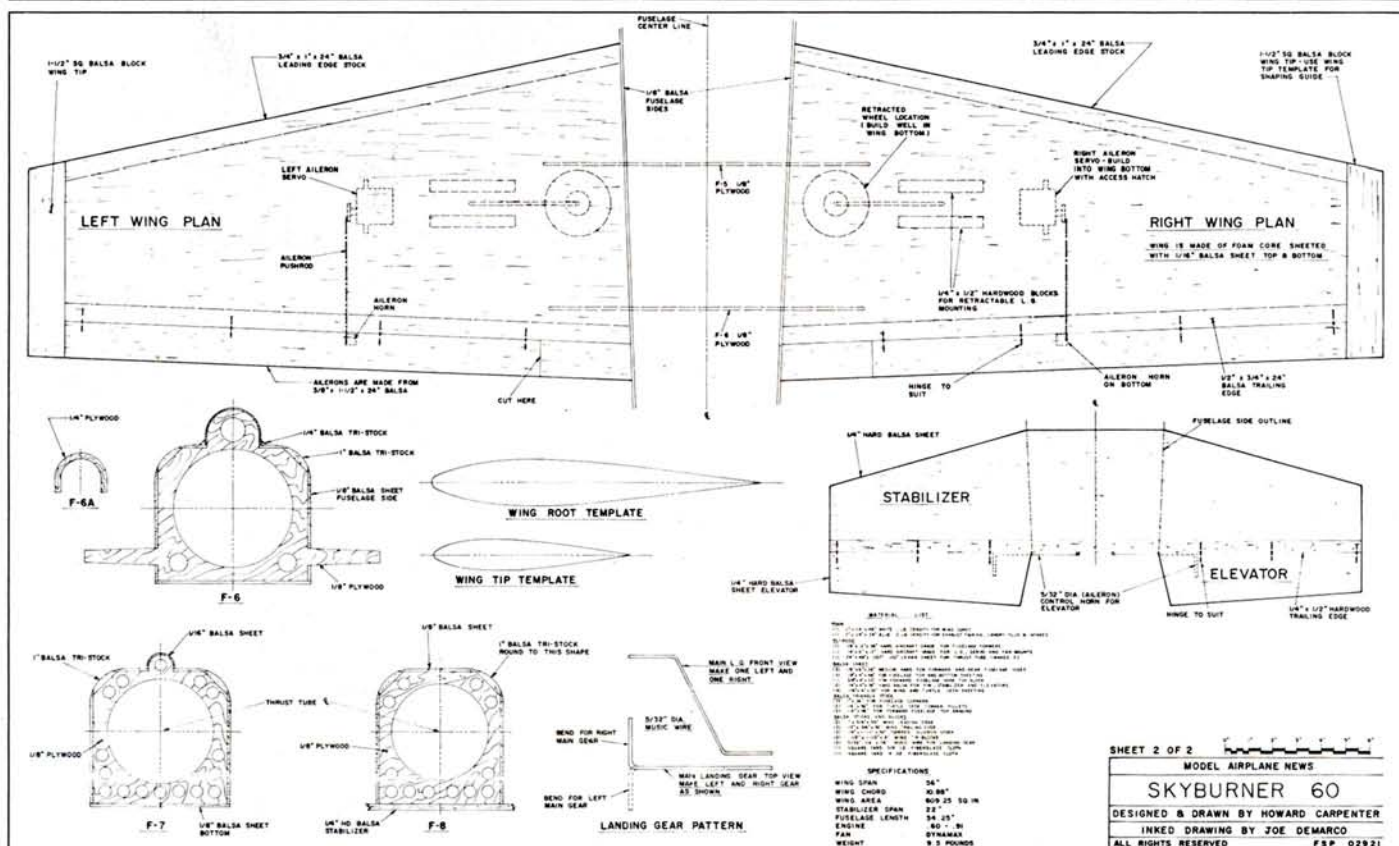
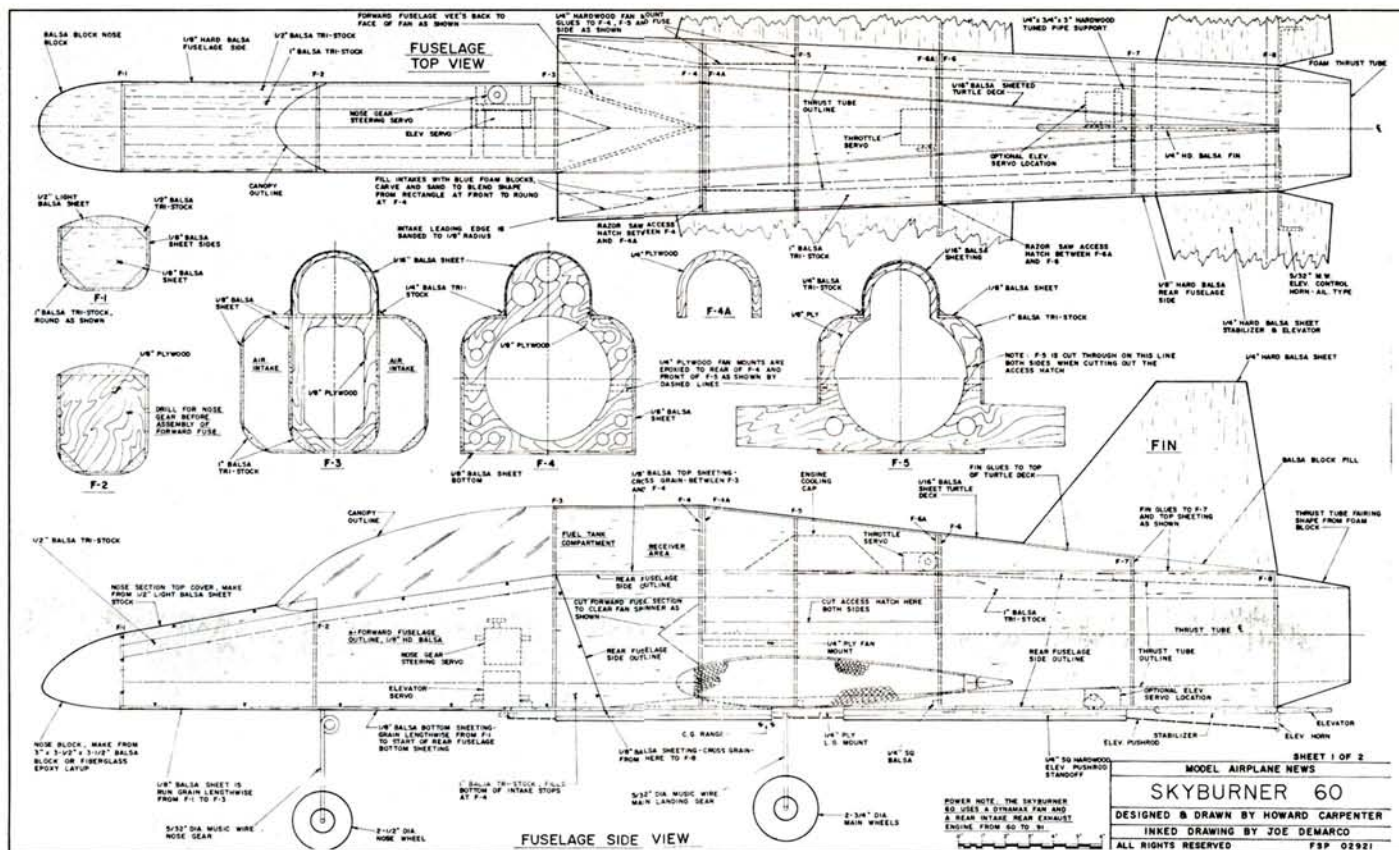


*Far right: The aileron servo and the main retract-gear installation.*

*The rear of the nose compartment contains the main fuel tank and the retract and steering servos. The canopy has been attached with two hinges, and it's held closed with a rubber band that's hooked to an eye-bolt. The front of the nose compartment contains the retract air tank.*







The Skyburner .60 uses a Dynamax fan and any rear-intake/rear-exhaust engine from .60 to .91ci. Don't let anyone tell you that a high-performance .61 doesn't have enough power. My first Skyburner has an O.S.\* Max .61 VR engine. Its climb rate and level-flight speed are

impressive. Rossi\*, Picco\*, Webra\* and OPS\* offer racing .61s that don't have to be modified for Dynamax duty, and they cost less than their .65 to .91ci big brothers. The .61s also vibrate less and consume less fuel. The plane featured in this article is powered by an

O.S. .77 engine, which puts out an average of 10 pounds of static thrust. With the plane weighing in at 9.5 pounds, the performance is spectacular!

You can make starter probes from 12-inch Black & Decker drill extensions. Open up the  
(Continued on page 137)



Inverted performance is nearly as good as upright, and I've spent more time flying the MC3 inverted than any of the last five sailplanes I've reviewed. Rolls are positive, smooth and precise, but not fast. It doesn't have sufficient down-elevator reserve for outside loops, but large inside loops are smooth and easy.

Slowing down too much in turns can precipitate a tip-stall and spin, which isn't surprising given the strong wing taper and sharp leading edge. The MC3 isn't promoted as a trainer, and experienced slope fliers know how to avoid this potential problem. Because it isn't a trainer, I wouldn't downgrade the model for this characteristic.

## MORE PILOTS

Next on the sticks was Bob Powers, a 20-year veteran of model airplane aerobatics, and a hardcore slope flier. Bob observed, "The MC3 is very enjoyable to fly. It has no faults, although I would have liked more control throw. It's an excellent airplane."

Finally, my son Louis flew it. He has had two seasons of sailplane experience, and he can roll an aileron slope ship. Louis, Bob and I all felt that the MC3 flew about as fast as the Bob Martin Coyote, although we didn't verify this with a radar gun.

We found a way to go faster. A  $3/16$ -inch steel rod inside the fiberglass wing-joiner tube added 3 ounces of ballast and considerably boosted the MC3's top speed. It didn't seem to hurt its ability to gain altitude, either. Later, flying in 30mph wind, we substituted a  $1/4$ -inch steel rod for the wing-joiner tube and got even more speed. [Editor's note: the manufacturer advises, for best performance, that you not add ballast or alter the ship design.]

During testing, I broke four wing rods on landing. The rods appear to be designed to give way in hard landings or crashes, like nylon wing bolts. The rubber nose cone also came off during some of these landings.

The MC3 is a fine-flying aerobatic slope soarer. It needs a minimum of 15mph of wind on a good hill to fly, but fly it will. Its complete prefabrication gets you into the air quickly. The storage case makes transportation safe and easy. No other airplane that I know of delivers this much fun and performance right out of the box.

\*Here are addresses of the companies mentioned in this article:  
RC Products, 7044 Arlington Ave., Riverside, CA 92503.  
Futaba Corp. of America, 4 Studebaker, Irvine, CA 92713.  
Ace R/C, P.O. Box 511, Higginsville, MO 64037.



*The MC3 flies nearly as well inverted as it does upright. Immelmann turns? This sailplane does them repeatedly with no strain or pain.*



*Here, I'm launching the model over a 65-foot hill into a wind of 15 to 18mph—good conditions for flying the MC3.*

by JOHN LUPPERGER

**M**y opportunity to examine the MC3 came when I met Mike Longfield (owner of RC Products) for a flying session at the Sandy Lane slope site in Riverside, CA.

The model is unique in that it doesn't contain a single piece of wood. The fuselage is molded of .004 ABS (early prototypes were made of polystyrene). The wing rod is made of a fiberglass arrow shaft, and the stabs simply slip onto two wires.

As soon as the wind started to blow (about 8mph), we were airborne. I had heard that the elevator control on pitcheron planes was soft, but I didn't really notice this on the MC3. I'd call it "smooth," not soft. The roll rate is quick and positive. After about 5 minutes, I had the plane doing multiple rolls and loops, and flying around inverted with ease.

When the wind picked up, Mike took out a heavier, all-black model. It had a fuselage made of .006 ABS and was equipped with



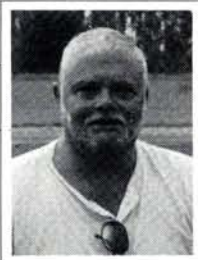
standard radio gear. Mike commented that most of his friends didn't like flying it because they had orientation problems with it. I was only on the sticks for about 5 minutes when I lost orientation. The model dove straight down (about 125 feet). I was sure we'd find a plastic jigsaw puzzle at the bottom of the hill.

To my amazement, the model wasn't seriously damaged. Its rubber nose cone had been knocked off, its fiberglass wing rod had snapped (without damaging the wings) and there were about four cracks in the front of its fuselage. With the proper CA and accelerator, the model could have been ready to fly again in a few minutes.

Its great carrying case and the option to buy the plane with or without the radio installed may make this the ultimate ARF. The model is quite aerobatic and flies fast enough to satisfy an experienced pilot, yet someone with very little aileron experience could handle it.



# SPORTY SCALE TECHNIQUES



FRANK TIANO

## NO SHELF PAPER AT TOP GUN!

I GUESS it's close enough to the 1992 version of Top Gun\* to start letting you in on what's new. First, Top Gun will have at least six scale helicopters competing this year. No, they won't have to go nose to nose with the big jets and the heavy metal, but they'll compete just as hard for their own trophy. As of right now, the static judging for scale helicopters will be on Friday morning; they'll fly two rounds on Friday afternoon and one round each on Saturday and Sunday. If it works out well, we may initiate a complete Top Gun Helicopter Challenge for 1993. This event will have its own dates and use the same delicious Palm Beach Polo Club field as the fixed-wing aircraft do.

Top Gun will commence on Thursday, May 7, and finish on Sunday afternoon, May 10. The West Palm Beach, FL, flying site is almost exactly the same as last year with one exception: the Polo Club has actually moved a couple of trees that some pilots found a little intimidating. Actually, they were just a teensy weensy bit in the way on final, but they're history now! Of course, many familiar scale personnel will be there, but 1992 will mark the return of several old favorites as well. For example,



Bob Underwood's Stormovik Russian Tank Buster features two types of painting. The red star and arrow were masked using Frisket paper, and the freehand writing was done over a lightly penciled guide.

with a big Thunderbolt; David Escobar just might give the big guns a rough time with his neat-looking A-10 Warthog; and Patti Violet and Paul Schuessler are teaming up again, but this time, with an outrageous T-33. If that's not enough to whet your aviator appetite, a trip to sunny Florida will also get you a peek at Kery Sterner's immaculate Starship, or maybe even his Pond Racer! After last year's event, I was told that lots of guys were going to build something brand new, something especially for Top Gun, and I, for one, just can't wait to see what's going to arrive.

Once again, Top Gun has enlisted the help of Cindy Burkey at Southport Travel for all Top Gun travel arrangements, alternate hotel bookings and rental vehicles. Recently, Cindy phoned to tell me that she was successful in getting American Airlines to help out (as it did last year) with reduced airfares to Florida from anywhere in the country. You may contact her at (800) 735-0401. Just give her the dates you wish to travel, and she'll take care of finding you the best route, the most economical airfare, the shortest layovers and the best rental deals! And don't forget, Cousin Louie from

Model Airplane News is once again teaming up with the Zap Gang to sponsor the majority of the whole shootin' match. But this year, you can look forward to meeting Louie and his dad (Doc DeFrancesco); Model Airplane News editor, Tom Atwood; that old snake in the grass, Chris Chianelli; and several others who make their living bringing you this exquisite piece of literature each month. More later!

### TSK, TSK, FRSK, FRSK, FRISKET

I have to make a very profound statement. No matter what you may have read elsewhere, scale modelers simply don't use contact shelf paper instead of decals on their scale airplanes! Scale modelers don't use contact shelf paper on their airplanes for anything permanent...period! If your new model didn't come with decals, there's lots of ways to get some good-looking markings. The easiest is to simply purchase a set of Mylar markings or water-slide decals from a kit manufacturer. For example, you can purchase a set of British roundels or German crosses in several sizes from Pica Enterprises\*. They use them on their Spitfires and Focke Wulfs. Byron Originals\* will sell you Mylar markings



Rich Uravitch used nothing but Frisket stencils and masking tape to paint every marking on this Top Gun award-winning SNJ-5.

Tom Cook is hooking up with Mark Frankel in team scale; Dennis Crooks (Mark's pilot in 1991) will have his very own entry in the Expert division. You'll be happy to hear that Kent "Cowboy" Walters will have his new enlarged Dauntless; Bob Frey will get back into the swing of things





Charlie Chambers used liquid masking film, Frisket and masking tape to do all the markings on his Masters-winning Platt P-51 Mustang.

from any of its kits and so will Top Flite\*, Marks Models\* and Midwest\*. Sig\* offers its complete line of decals separately, and if you're doing an American jet, Bob Violett Models\* has several sizes available. If all else fails, and you simply can't find anything to ring your chimes, you ought to give Major Decals\* a try. They have markings for just about any subject you can think of, and they probably have it in several sizes! For example, I know for a fact that they have markings for the Flying Tigers, Swedish, early and late German, Russian, Japanese, British and French Air Forces. They have starts, miniature bombs, kill markings, trim sheets—the works. And they're all on really thin Mylar so you don't see or feel an ugly edge that you'd see on some of those kits that contain those cheap, shelf-paper markings!

Applying markings is really easy. If you're using the water-slide variety, simply cut the marking as close as you can to its outline, soak it in warm water, slide it off its backing onto your model, and gently squeegee the water out from underneath it. The result will amaze you. For the Mylar type, the application is almost the same. Spray some window cleaner on the spot where the marking will be applied. Peel the first inch of the marking from its backing, and lay it into position. You'll notice that the window cleaner allows you to slide the marking around easily. When you're pretty much in position, remove the balance of the backing, place the marking exactly where you want it, and squeegee the water out from underneath it as you did with the decals. The Mylar film lays down really tight to the surface, and you won't see a bubble, no

matter how closely you scrutinize it! A couple of light coats of gloss or flat clear will protect the markings for as long as you own the airplane, certainly long after a shelf-paper version would have faded, wrinkled up and starting peeling at every edge.

There's an alternative to decals and Mylars. Aeroloft\* rub-off markings, you say? Yes, they're certainly an excellent choice, but even our old friend Steve Slachta doesn't have every single marking in stock. So what do we do? Simple. We get that ridiculously cheap shelf paper with the sticky stuff on one side, and we use it as a template for making our very own markings. Or, we go to our favorite art store or fancy hobby shop, and we get what artists use to make stencils. We get something called "Frisket paper." Frisket paper and shelf paper are similar. Frisket is better because paint won't wrinkle its edges as easily as it does shelf paper.

Anyway, you simply find a marking you like and get an appropriately sized copy of it from any place that has a copy machine that enlarges and reduces. Sometimes you'll need several copies of the same marking. Next, place a piece of Frisket on the model where you want the marking to be. The Frisket paper should be about 3 inches larger all around than the size of the marking. Now, glue the copy of your marking to the Frisket with contact cement. Carefully cut out the outline of the copied marking, and use just enough pressure to cut through the paper copy and the Mylar Frisket. Remove the interior portion of the marking, and burnish down all edges so paint can't seep underneath them. Lightly spray paint the

(Continued on page 42)

## ALUMINUM SPINNERS

- Complete Units include spinner, spinner nut, and bushing set.



- Complete assortment of spinner nuts
- Easy to assemble; easy to use
- Precision machined
- Recommended for use with electric starters
- Great for fun fliers
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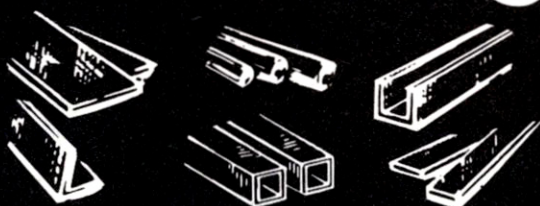
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231	.016 x 1/2	.35
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233	.016 x 3/4	.45
234	.016 x 2	.95
235	.025 x 1/4	.30
236	.025 x 1/2	.50
237	.025 x 1	.90
238	.025 x 3/4	.65
239	.025 x 2	1.70
240	.032 x 1/4	.35
241	.032 x 1/2	.55
242	.032 x 1	.95
243	.032 x 3/4	.75
244	.032 x 2	1.90
245	.064 x 1/4	.70
246	.064 x 1/2	1.15
247	.064 x 3/4	1.40
248	.064 x 1	1.90
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## SPORTY SCALE

(Continued from page 41)



These Violet F-86 Sabres show all types of marking. The airplane in the foreground features painted markings with only the star-and-bar decal. The Skyblazer finish is all from Aerofoil, and the third is a combo of paint and Aerofoil.

marking the proper color, wait a few minutes for the paint to tack up, and spray on a few more light coats. Let it thoroughly cure, and repeat the procedure if you must apply another color, only this time, you'll also place the Frisket over the previously painted area to protect it. Cut and remove the next area of Frisket and paint again. Finally, remove the entire beginning layer of Frisket or shelf paper, and you have a perfectly applied marking—in paint—just like the pros have! Lightly wet-sand the completed marking, and I'll bet everybody will think that you had those insignias applied by a professional sign painter. I guarantee you that they won't be mistaken for shelf-paper markings!

Until next time, don't forget that dirty wind socks point in the wrong direction. Your six is still clear.

\*Here are the addresses of the companies mentioned in this article:

Top Gun/Frank Tiano, 15300 Estancia Ln., W. Palm Beach, FL 33414.

Pica Products, 2657 N.E. 188 St., Miami, FL 33180.

Byron Originals, P.O. Box 279, Ida Grove, IA 51445.

Top Flite Models, 2635 S. Wabash Ave., Chicago, IL 60616.

Marks Models, 1578 Osage, San Marcos, CA 92069.

Midwest Products Co., 400 S. Indiana St., Hobart, IN 46342.

Sig Manufacturing Co., 401 S. Front St., Montezuma, IA 50171.

Bob Violett Models, 1373 Citrus Rd., Winter Springs, FL 32708.

Major Decals, 21 Fisher Ave., E. Longmeadow, MA 01028.

Aerofoil, 2940 W. Gregg Dr., Chandler, AZ 85222

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# BUILDING MODEL AIRPLANES



JOE WAGNER

## MAKING DOPES MIX

TWO COLUMNS AGO, in a discussion of models painted with dope, I described repairing a damaged butyrate-doped airplane of mine. In re-covering, I brushed nitrate dope over the original finish. Though that's always been considered asking for disaster, I had no trouble at all.

That column drew a strong response from the folks at Sig\*. Their highly respected designer Claude McCullough said he *ruined* a scale-model's finish by accidentally putting nitrate dope on top of butyrate. I've heard similar reports from other expert modelers, including my old friend George Aldrich.

Was my experience a lucky fluke? It happened that I had a freshly crashed model on hand—just right for performing further experiments to verify my previous discovery. The airplane (a Sig Skyray 1/2A profile U-control model) had been finished from the bare wood out with Sig's butyrate dope. While rebuilding, I tried as many variations of dope-finishing techniques as I could think of. I spent over two weeks experimenting with Sig and Randolph's\* nitrate and butyrate dopes. Here's what I found:

■ A major secret of my success in applying "incompatible" finishes seems to be using Randolph's Retarder for thinner. Its sol-



*Can this be magic? Randolph's Retarder, a blend of special, slowly evaporating solvents, appears to make nitrate and butyrate dopes compatible.*

## MANY MILITARY MARKINGS

Often, it seems that after your new model airplane has been built and covered, and its basic finish has been completed, you're only about half finished with the project! Radio and engine installation take time, of course, but the really lengthy job often comes in the decorating.

Several methods of applying insignia, lettering, and license numbers are at our disposal. They can be painted; cut out of colored tissue paper and doped into place; applied with iron-on or stick-on plastic film; or made with decals.

This last one is by far the quickest, neatest method of adding markings such as wing roundels to a scale model. Possibly the best source of high-quality model airplane decals is Northeast Screen Graphics\*, producers of "Major Decals." The Major line includes an incredible range of letters and numbers, in 10 colors and both water-slide and "sticky-back" styles. All are fuelproof for glow fuels of up to 12 percent nitro. So are Major's military insignia decals. Besides the usual USAF, U.S. Navy, RAF, Luftwaffe and Russian Air Force markings, Major also carries French, Italian, Polish, Israeli, and even Canadian, Australian, New Zealand and Swedish decals. All are available in both water-transfer and pressure-sensitive types.

Something that I particularly like about Major decals: every sheet (each packaged in its own plastic envelope) comes with a detailed set of instructions for easy, yet perfectly aligned, permanent application.

As well as the many styles and types of Major decals I've already listed, Northeast Graphics also makes colorful military squadron insignia: Flying Tigers; Kicking Mule; Hat-in-the-Ring;



*Several companies supply U.S., British, German and Russian insignia decals. Only Major sells Polish, Italian, and New Zealand markings. They also sell propeller emblems, kill tallies and squadron insignias.*

Lafayette Escadrille; Casa da Savoia—18 WWII German squadrons are represented as well. Major even has decals for scale propellers: Sensenich, McCauley, Hamilton Standard and more.

Neat, professional-quality, durable markings add a lot of appeal to almost any R/C model airplane. Major Decals can contribute that "special look" to your project!

*\*Here's the address of the company featured in this article: Northeast Screen Graphics, 21 Fisher Ave., East Longmeadow, MA 01028.*



## BUILDING AIRPLANES

vents appear to have a "marrying" action between nitrate and butyrate. They also slow dope's drying time so much that I can brush it out almost as if it were varnish.

■ If you wet-sand between coats of dope and merely dry off the surface with paper towels before repainting, bad things can happen. Even fully cured dope absorbs *some* water. It's as important to let that water evaporate out of the finish before re-coating as it is to allow the thinner itself to dissipate thoroughly.

■ Sig's Dave Falkenhagen tells me that their dope pigments come from automotive finish suppliers. The reason some Sig dope colors require many coats for opaque coverage lies in today's car buyers' desire for "depth" in their automobile paint jobs. "Candy"-type finishes require translucency rather than opacity—and many coats of paint. Dave F. asked the pigment vendors, "How many cars get painted Cub Yellow?" "Very few," they told him. "But we use a lot of yellow in blending other colors."

Randolph's colored dope contains the same opaque pigments as expensive types of artists' acrylic and oil paints: cadmium reds and yellows, cobalt and ultramarine blues, etc. That's why Randolph's dope costs more than Sig's—and why less of it is needed.

■ High drying temperatures—especially in direct sunlight—can cause severe finishing problems: the solvent trapped under the surface actually boils. For dope finishing, 70 to 80 degrees seems optimum.



*Airplane dope provides the only practicable method of finishing a project like this impressive Hawker Hurricane by Emmett Fry of Little Rock, AR.*

■ Butyrate dope cures in two stages. The initial solvent dry-out resembles the first stage of two-part epoxy paint curing. When that's complete, the butyrate "resins" combine with each other and with oxygen from the air in roughly the same way as boiled linseed oil oxidizes into an insoluble coating. That's why it takes about three days at normal temperature before butyrate dope becomes reasonably fuel-resistant.

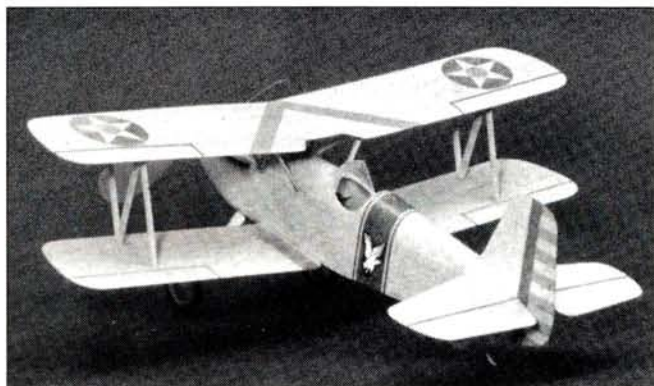
■ Butyrate dope isn't nearly as "sticky" as nitrate. It often pulls away from and "bridges" at right-angle joints such as a wing-to-fuselage juncture. To ensure the best adhesion, sand all the gloss off the previous finish before applying a fresh coat of butyrate.

In conclusion, I want to emphasize that I've been experimenting only with presently available Sig and Randolph nitrate and butyrate dopes. What I've learned probably doesn't hold true with AeroGloss\* or other brands of model airplane finishes. So, to be certain of good results on your own models, always test your finishing materials on scrap wood or a mock-up before committing your efforts to the real project. By doing that, you could be saving yourself a lot of problems!

\*Here are the addresses of the companies mentioned in this article:  
Sig Mfg., 401 S. Front St., Montezuma, IA 50171.  
Randolph Products, distributed by ABC Hobby Supplies, P.O. Box 2391, Clarksville, IN 47131.  
AeroGloss, distributed by Pactra, 620 Buckbee St., Rockford, IL 61104.



*This once-broken Sig Skyray was an ideal guinea pig for finishing experiments. I repaired it with CA and both Sig and Randolph butyrate and nitrate dope. Coats were applied atop one another in random order.*



*Clear dope and colored tissue make a light, attractive decorative scheme. However, most colored tissue fades badly with age and exposure to sunlight.*



# ENGINES ALOFT

BOB GILBERT



## IT'S ALIVE! - AVOIDING DEAD-STICKS

WHEN I END a letter, I often precede my signature with "Keep 'em flying!" Flying R/C is something that I love to do; I do it regularly; and I love watching others do it.

Often, when I'm at the field, however, I find would-be fliers who are having trouble keeping them flying. In an effort to help those of you who may not have that friendly engine expert standing by, I've generated a list of items that I've seen cause my planes and the planes of others to experience engine failure. Following each common problem, you'll find the most likely cause and its cure.

### ENGINE FAILURE JUST AFTER TAKEOFF

**Cause I.** High-speed needle is set too lean. (I see this almost every time I go to the field, and it's avoidable 99 percent of the time.)

**Cure.** Open the needle valve a bit, then be sure to test by holding the nose straight up with full throttle. The engine must *not* sag when this is done. Especially with a new engine, or on any first flight, be sure the needle valve is set a little on the rich side.

**Cause II.** The fuel-tank clunk is in the front of the tank. This often happens on the flight following a hard landing or crash.

**Cure.** Grip the aircraft firmly, and thrust it forward. If the clunk wasn't audible before this movement, but it *is* now, it has probably repositioned itself correctly. Test by

running the engine for a few minutes at full throttle with the nose up.

**Cause III.** The fuel-tank line came off in the tank, and the tank was only half full at takeoff.

**Cure.** Remove the tank and install a new line. (See the first tip under "Helpful Hints.")

### ENGINE LEANS OUT AND QUILTS

**Cause I.** The high-speed needle valve is too lean.

**Cure.** Open the needle valve and test by holding the nose straight up with full throttle.

**Cause II.** The muffler pressure line came off.

**Cure.** Replace with a new line.

**Cause III.** The fuel filter has opened up (the halves are loose).

**Cure.** Tighten the halves firmly. Test-run the engine on the ground.

**Cause IV.** There's a split in the fuel line—usually at the fuel tank.

**Cure.** Remove the line and replace it with a new one. (See the first tip under "Helpful Hints.")

**Cause V.** The fuel tank is foaming, causing air bubbles in the fuel line.

**Cure.** Balance the prop and wrap the tank in foam.



Be sure to test the high-speed needle valve by holding the nose straight up with full throttle.

### ENGINE THROWS PROP WHEN STARTING

**Cause I.** The engine is badly flooded.

**Cure.** Remove the glow plug, and spin the engine. Caution! Keep your eyes clear of the plug opening as raw fuel will spurt out, and it could harm your eyes. Test the plug and replace it.

**Cause II.** The prop nut is loose.

**Cure.** Tighten the prop nut. Remember that the nuts for wooden props, in particular, should be tightened before each flying session.

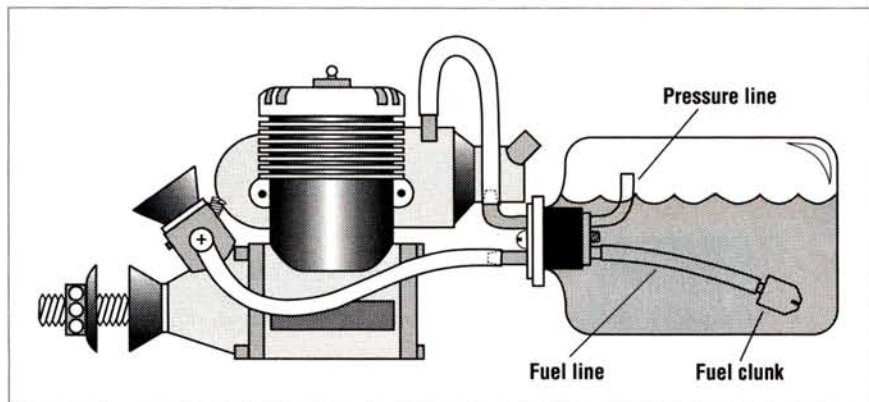
**Cause III.** The glow plug is the wrong one.

**Cure.** Try a "colder" plug (for "later" ignition timing).

### ENGINE LOSES RPM WITHOUT THE GLOW BATTERY

**Cause I.** The glow plug is defective.

**Cure.** Replace the glow plug.



If the fuel clunk gets jammed forward during a hard landing, your engine will probably die during your next flight. Make sure it's correctly positioned, as shown here.



**Cause II.** The needle-valve setting is much too rich.

**Cure.** Turn the needle valve in a little at a time until the engine speeds up, then remove battery.

### ENGINE FAILS IN FLIGHT, BUT ISN'T OUT OF FUEL

**Cause I.** The fuel tank is too low.

**Cure 1.** Raise the tank until its center line is approximately on the same level as the carburetor.

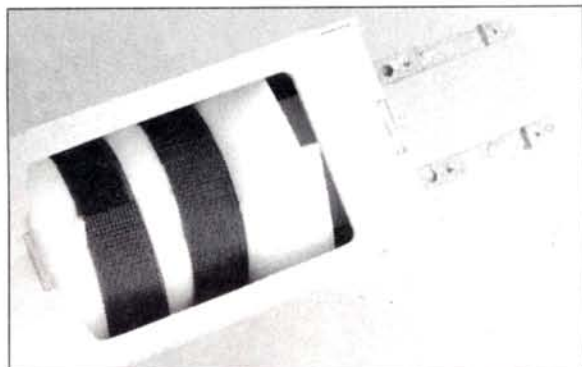
**Cure 2.** If Cure 1 isn't possible, add an external pump to the engine.

**Cure 3.** See also "Engine Failure Just After Takeoff."

**Cause II.** The engine overheats.

**Cure 1.** The engine is new and requires some additional break-in. Try running through a few more tanks of fuel on the ground with the carburetor set on the rich side.

**Cure 2** The prop is too large. Try one with a smaller diameter or a lower pitch.



*If you wrap your fuel tank in protective foam, you'll minimize the chance of leaning-out because of fuel foaming. (Shown here: Model Aviation Products Secur Rap.)*

**Cause III.** The back cover has loosened. This will also make it difficult to start.

**Cure.** Tighten the back cover. The gasket may have to be replaced, or the use of silicone gasket maker may be in order.

**Cause IV.** The glow plug has loosened.

**Cure.** Tighten the glow plug.

**Cause V.** The muffler has loosened.

**Cure.** If you're lucky, you'll start to hear

more noise, at which time you should immediately throttle back and land. If you do, you may save the screws and can then tighten them. If the muffler has fallen off, don't throttle back all the way, as the engine will die. Wait until you have the field made, then close the throttle and shut off the engine.

### HELPFUL HINTS

- If possible, use a new fuel line rather than just trimming back the old one. The new line will stay on better because it hasn't stretched, and its "flex life" is just starting.

The next hints are for beginners—just to try to help you get airborne faster and more often.

- If possible, make your fuel-tank lines visible. Put a fuel filter somewhere on your fuel can to filter the fuel going into the tank, but *do not* put one in your fuel line.

- Round off the leading and trailing edges of those props, and then balance them.

- Stay away from those .60 engines and

pattern planes until you've had quite some time at the sticks. I also strongly suggest that you *do not* start with an engine that's smaller than a .20, and be sure it's a 2-stroke.

- Don't put a cowl around the engine—at least, not for the first few flights.

- Use a glow-battery system that has a meter or some other means of alerting you to a dead glow plug.

- This has nothing to do with engines, but if you fly off a grass field, *do not* attempt to do so with wheels any smaller than 2 1/2 inches in diameter.

Well, that does it for this month. I welcome your comments, so please drop me a line in care of *Model Airplane News*. Please help me to write a column that will really help others keep 'em flying. ■



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## SPECIFICATIONS

Type: Sport competition fun fly  
 Wingspan: 53 inches  
 Length: 46 inches  
 Weight: 4 to 4.5 pounds  
 Wing Area: 558 square inches  
 Wing Loading: 16 to 19 ounces per square foot  
 Power Req'd: .25 to .40 2-stroke; .40 to .48 4-stroke  
 Prop Used: 9x6 APC  
 No. of Channels Req'd: 4 (rudder, ailerons, elevator and throttle)  
 Radio Used: Hitec Focus 6 FM  
 Sug. Retail Price: \$89.95

**FEATURES:** hardware includes motor mount, hinges, landing gear and flight-surface equipment. Most of the parts are made out of die-cut balsa and ply, and full-size plans are included. It can be built either as a trike or a tail-dragger.

## HITS:

- The Fun-One is built to withstand high-stress flight.
- The instructions are excellent.
- The hardware package is complete.
- The wide flight envelope allows the Fun-One to be enjoyed by pilots of every category above novice.
- The ground clearance is excellent.

## MISSES:

- The quality of the balsa wasn't as good as that in other Great Planes kits.
- The dimension in the plans for elevator joiner wire were incorrect.

## Hitec Focus 6 FM

**T**he Focus 6 radio has many desirable features. The transmitter has adjustable control sticks, automatic travel volume on the primary four channels, servo-reversing on all channels, FM modulation, a trainer output connector and a rechargeable battery pack. It's light, compact and easy to handle.

On the receiver side, the Focus 6 uses the famous Platinum grade receiver from Hitec/RCD. This was one of the first after market receivers made for use with 1991 qualified transmitters, and it exceeds all AMA requirements for operation under the



*The Hitec Focus 6 radio system and the Fun-One are a good combination!*

new FCC rules for R/C. The receiver is a dual-conversion type, and it has plugs for seven channels.

The Focus 6 is equipped with HS-500 servos that feature splined output shafts, a 42-ounce torque output, a transit time of 0.24 second for a 60-degree rotation and a nylon bearing support. They're the size of standard servos, and they fit easily into most sport applications. The connectors are compatible with Futaba.

I had no problems with the Focus 6 radio, and its range was excellent. The sticks felt natural at full length, and its compact size made it easy to handle during long flights. The Focus 6 radio system is a great deal for pilots who are looking for a reliable system at a modest price.

True competition fun-fly aircraft are ugly-looking flying machines that are designed with one goal in mind: to make high-speed maneuvers in the sky. They became so specialized in design, however, that they were unable to withstand the rigors of the sport hot-dog flight that most pilots crave. In fact, most true competition fun-fly birds aren't capable of high-speed, straight-line flight. Their fragile construction results in severe structural damage, and this leaves a gap between the competition birds and the normal sporting aircraft.

Great Planes\* has a new bird to fill this gap: the Fun-One is a strong, well-built sport aircraft that's designed for high-speed maneuvering and high-speed flight. The Fun-One looks good, and it's capable of being wrung out in the air. Its snappy air speed will also get your adrenaline going.

The Fun-One is designed for today's most popular engines, i.e., the .25 to .40 2-strokes and the .40 to .48 4-strokes. The plane is modest in size, with a 53-inch wingspan, and it has a generous wing area of 558 square inches. In other words, it fits right into the common sport aircraft size, but it has uncommon flight characteristics. Let's take a look at the kit first.

The kit has a full-size set of plans and detailed instructions, and the die

patterns are a nice touch. With them, you can identify every part of the aircraft. A check list is also included so that you can account for all the parts. There's a very big note at the beginning of the instructions that reads, "This is not a beginner's airplane!" Heed those words, folks. Although the Fun-One isn't difficult to build, it takes some experience to fly it.

Starting at the tail, the horizontal and vertical stabs are completely built up of balsa, and this reduces the weight in the tail. There are a lot of parts to cut, but you'll be rewarded with a nice-looking, strong assembly. I did find one error: the elevator joiner wire shown in the plans was too small, but this should be no big



## FLIGHT PERFORMANCE

### • TAKEOFF AND LANDING

The Fun-One has very good takeoff characteristics which, in this case, are aided by the tricycle-gear setup. Taxi characteristics are also good, and they should allow for high-speed taxiing for fun-fly ground events. Once the throttle comes up, the Fun-One tracks straight and true, and this makes liftoffs easy. On landing, it slows up at a fair rate and glides quite nicely. Landing the bird is a joy: it practically walks onto the runway. This will make the spot-landing pilot happy.

### • HIGH SPEED PERFORMANCE

Considering its heavy construction, the Fun-One has a very wide flight envelope. It's capable of high-speed flight that's comparable to a Sport Quikie 500. The strong wing should withstand any high-speed maneuver thrown at it.

### • LOW SPEED PERFORMANCE

Dropping the throttle on the Fun-One does only one thing: it reduces the speed. It doesn't tuck under or balloon the nose. The glide remains very predictable, and using the throttle to control the approach works well. For a ship with no wing washout, it displays no tip-stall characteristics. I never did get the bird to fall out of the sky; it simply slows way down and mushes forward. If it ever suffered a dead-stick situation, even an inexperienced pilot should be able to get it to the runway. It was only in this situation that I was able to get the Fun-One to stall out. The nose drops quickly, and you'll need a good 20 feet of altitude to recover the ship in time for a save.

### • AEROBATICS

Rolling is rapid, but not beyond the speed that any sport pilot can't handle. The roll rate is actually sensitive around center, but it seems to dampen out at full throw. The Fun-One rolls at about three rolls in 2 seconds. It performs snapping maneuvers well, but it has excessive roll-coupling from the rudder to knife-edge (rudder input causes the model to roll out of the knife-edge attitude). Loops are tight for a plane of this size, probably the tightest I've seen in any sport model because of the large elevator. The high-aspect-ratio wing apparently prevents the Fun-One from snapping out of the tighter loops, and that should keep pilots out of trouble. No rudder input is necessary to hold a true loop. Elevator response is very nice, and it's responsive throughout the flight envelope.

If the bird is flown with flap/elevator coupling, the loops will be tighter, and you'll finally approach the point of snap rolling at the top of the loop. The trick here is to ease off the throttle at the top of the loop. It will do amazingly quick outside loops if the flaps are left coupled, so make sure you're ready for it.

The symmetrical wing section mated to the high aspect ratio tends to smooth out the Fun-One. While the longer wing prevents extremely fast rolling, it also keeps the plane from developing any nasty habits. Trim changes are nonexistent when the throttle is used, including any need for rudder to offset engine torque.



*With its fuselage framed, the Fun-One is ready for the turtle deck. Although the fuselage is made out of three main pieces, it's still very strong.*

deal for an experienced builder. You can also choose between a tail-dragger and a tricycle-gear. If you decide to drag the rudder, install it with the tail-wheel strut.

### THE FUSELAGE

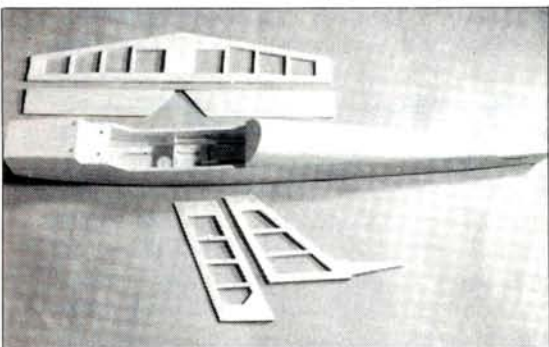
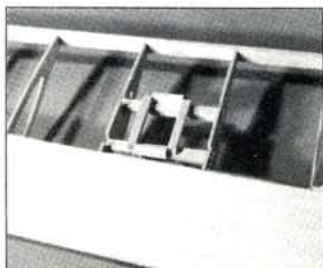
The fuselage is next, and this is one hefty assembly. Three separate parts make one fuselage side, which is unusual. The heavy-stock balsa requires a little more work, but it handles well enough. A lite-ply doubler adheres to the fuse sides from the nose to the rear of the wing saddle, and another one is placed just ahead of the stab and goes to the tail. It may seem like overkill, but when a high-performance stunt takes a bird apart, the fuselage usually breaks right where the Fun-One is reinforced. The designer was thinking.

Once the sides are ready, install the formers and the fuselage bottom sheeting. Everything locks into place to prevent the fuselage from warping. In fact, the instructions say that you can assemble a warp-free fuselage in your lap, and that's just what I did.

Now, place the upper deck (sheet balsa that's curved around the upper formers) on the fuselage. The instructions tell you how to do this painlessly, and you should have no problem. After this, install the forward sheeting and the reinforcements.

(Continued on page 90)

The wing servo bay is roughed-in when the basic wing assembly is built.



*The completed fuselage and tail feathers, sanded and ready for covering.*



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## AIRWAVES

(Continued from page 10)

### GETTING LUBED

I have some questions about model fuels. Is medicinal castor oil useable in model fuels? Are there different types of castor oil? Are any 2-cycle oils (the type used for motorcycles,

lawn mowers, etc.) suitable for hobby motors? What brands/types/weights/grades of synthetic oil can be used in model fuels?

STAN M. BIDOWSKI  
Winnipeg, Manitoba, Canada

Stan, it sounds as if you want to brew your own fuel. Go for it, but be careful. Castor oil

is used in methanol-based fuels because it's miscible (will mix completely) in them. For years, it was the choice for model airplane fuel. The best oil is Baker's AA or AAA degummed castor oil (available at most retail outlets that handle industrial lubricants). As

(Continued on page 78)

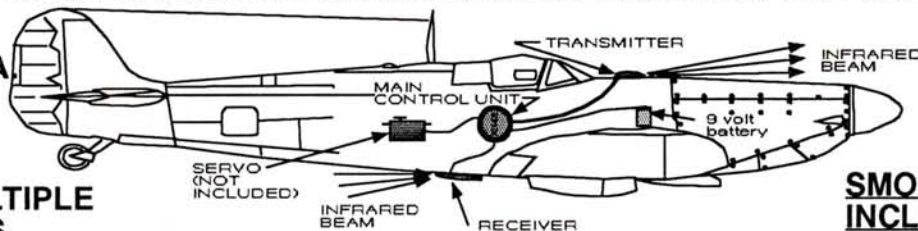
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A note about smoker systems. First, for aerial combat, a smoker system that works like a fogger is not altogether necessary. You just need a good stream of smoke clearly visible from the ground. Additionally, since the volume of smoke required is considerably less than that required for aerobatics, the capacity of the smoker tank can be 2 oz. for easy installation. The smoke system included with ACE MAKER consists of a Perry pump, check valve and smoker valve.

As shown, the transmitter is mounted on top of the fuselage and the receiver is mounted on the bottom of the fuselage or wing. The main control unit and battery are mounted inside, with the main power switch mounted like your flight pack power switch.

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**S**OME READERS may question the value of the drag-reduction techniques outlined in this series of articles, particularly since they involve extra time, effort and cost to achieve. Reduced drag has the following benefits:

- Improved acceleration and, with proper propeller pitch and diameter selection, higher flight speeds and better vertical performance. A drag of 30 ounces at 50mph (mentioned in Part 1) increases the model's weight by that amount when climbing.
- At slower speeds and lower rpm, fuel consumption is reduced.

- The fully balsa-cowled engine and muffler are distinctly quieter.
- The use of slotted flaps as outlined in the two-part series "Design For Flaps" (*Model Airplane News*, October and November '91) will provide very quick take-offs when half extended, and slow, steep landing approaches and gentle touchdowns when fully extended. By selecting the angle at which the flaps are deployed (from 0 to 40 degrees) and adjusting engine rpm, it's possible to fly at any chosen speed from just above the stall at 20mph to the maximum speed; for the Swift, that's estimated at 90mph.

- The quickly and easily removed engine cowling and upper fuselage make servicing of the engine, fuel tank, servos, etc., very convenient.
- The model will look sleek and fast even standing still; one can be proud of both its appearance and performance.
- Flying a low-drag, slotted-flap-equipped model provides a new and thrilling experience.

The following deals with drag reduction for wings and tail surfaces and the engine and muffler.

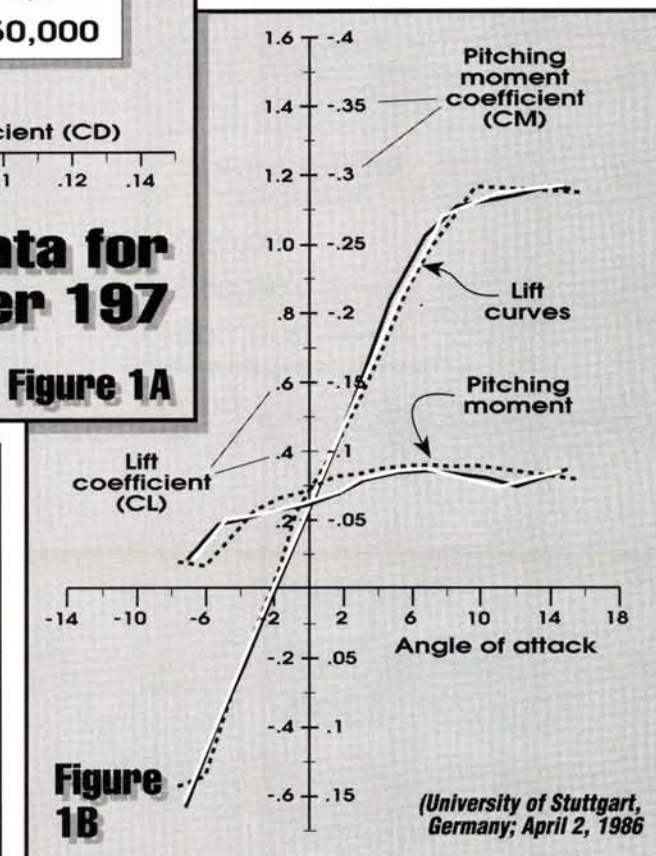
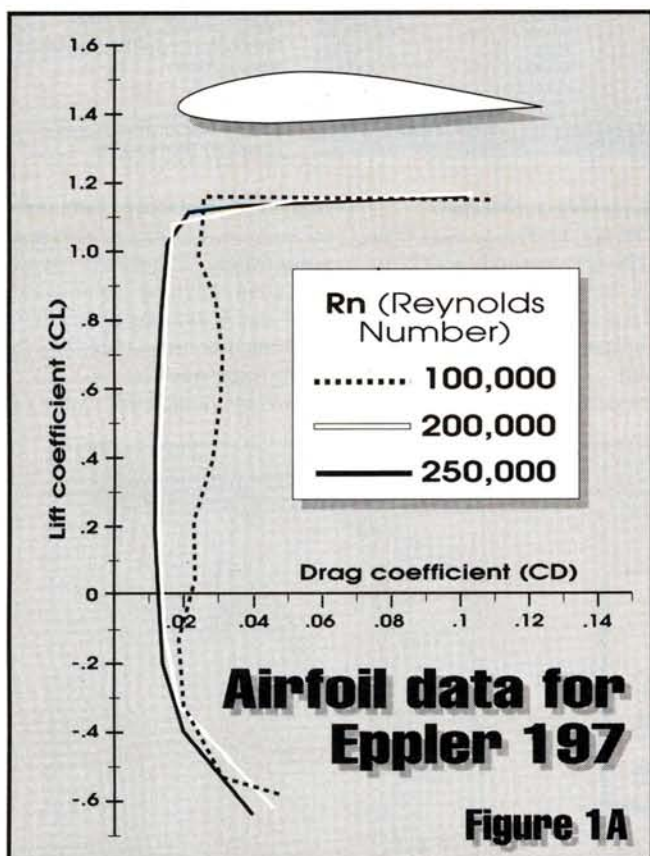
### WINGS AND TAIL SURFACES

There are three major considerations in wing design: wing cross-section or airfoil; aspect ratio; and plan form.

- **Airfoils.** Of the three, airfoil selection is the most critical. Select from those airfoil sections for which there are wind-tunnel test curves at model airplane Reynolds numbers ( $R_n$ ).

# Reducing Drag, Part 2

by ANDY LENNON



Figures 1A and 1B are examples—the Eppler E197 section. On the right, the lift curves show a maximum lift coefficient of 1.15 with a gentle stall. The pitching moment is fairly constant for all angles of attack.

On the left, the polar curves show the profile drag coefficient versus the lift coefficient. Note that the profile drag coefficient is low despite the increasing lift coefficient, except at the low  $R_n$  of 100,000. A wing of 6 inches in chord flying at 20mph would be operating near  $R_n$  100,000. Table 1 provides the data for reproducing E197 for any chord length.

This airfoil is 13.42 percent of its chord in depth, permitting strong, but light, wing structures.

For tail surfaces, Figures 2A and 2B provide curves for the symmetrical Eppler E168 section. Note, on the left, the higher profile drag at  $R_n$  60,000. A 4-inch chord flying at 20mph would be operating at  $R_n$  60,000. Avoid chords below 5 inches on tail surfaces. Table 2 provides data for duplicating this section.

Build a  
more  
efficient  
airplane



# Reducing Drag, Part 2

• **Aspect ratio (AR).** This is the ratio of the average chord to the wingspan. It's easily calculated.

$$\text{Aspect ratio} = \frac{\text{Span (inches)}^2}{\text{Wing area (square inches)}}$$

For example, the Swift's wing area is 600 square inches, and its wingspan is 61.5 inches. Its AR is

$$\frac{61.5 \times 61.5}{600} \text{ or } 6.3$$

Aspect ratio has an impact on induced drag; the higher the AR, the lower that drag. This is why soaring gliders have long, slender, high-AR wings. For models, high AR results in narrow chords that have higher profile drag at low  $R_N$ s. This defeats the lower induced drag benefits of the high ARs.

Long, slender wings impose greater stresses at the wing roots and require stronger structures. In aerobatics, they slow any maneuvers involving rolls.

For R/C sport models, ARs of 5 to 7 are suggested—a nimble airplane results and, on smaller models, prevents narrow chords and low  $R_N$ s.

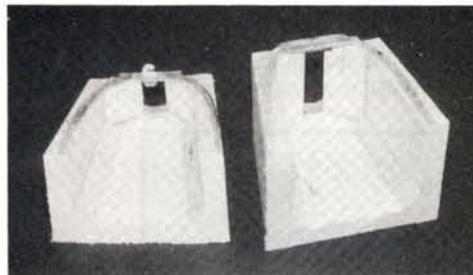
• **Plan form.** This is the wing's shape as viewed from above. It may be straight, tapered, a combination of straight and tapered, or elliptical. It may also be swept back or swept forward.

The elliptical is the most efficient plan form, but it's difficult to make. In addition, the tips fly at low  $R_N$  and are prone to tip-stalling.

Tapered wings with taper ratios (ratio of tip chord to root chord) of .5 to .6 are close to elliptical wings in efficiency. Each rib is different and laying them out is time consuming. The wing is strongest at the root, but, on small wings, the lower tip chord results in lower  $R_N$ s, higher drag, and risk



1. Above: engine and cowling installation with lower cowling removed. Note the phosphor-bronze wire glow-plug clip.



2. Above: the removable lower cowling. The three Goldberg flat hold-down hooks show clearly.

3. Left: inside view of a cowling under construction.

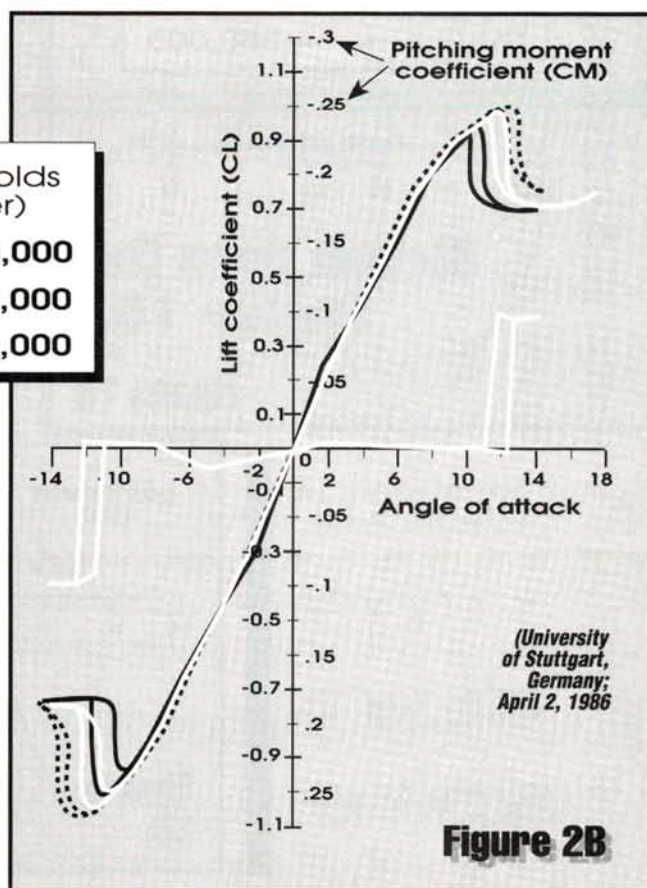
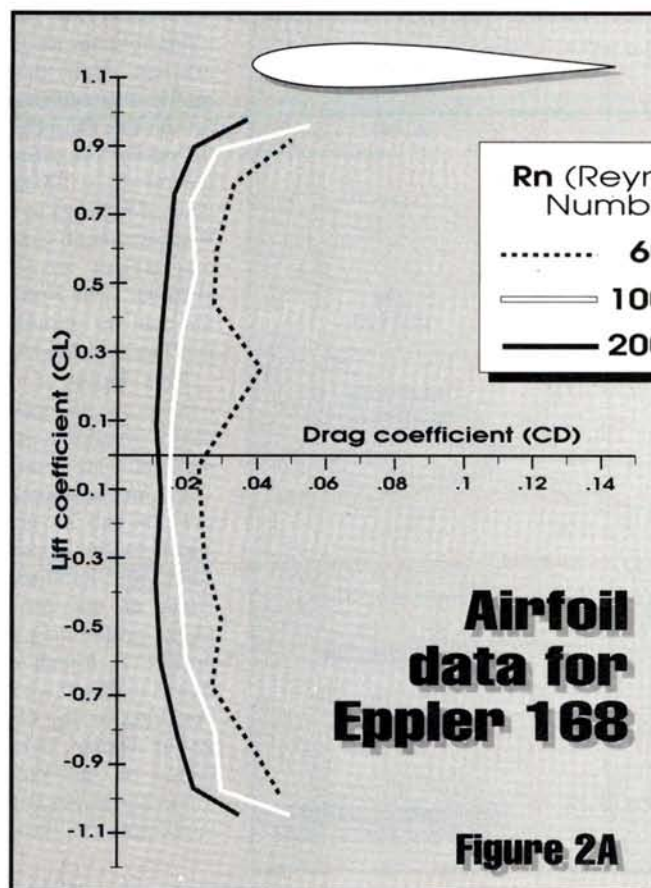
of tip-stalling at low speed.

This also applies to combined straight and tapered wings, in which the wing is straight for 50 to 60 percent of the semi-span and the outboard 40 to 50 percent is tapered.

A modest sweep back of 5 to 10

degrees is popular in pattern models because it improves aerobatic performance. Swept-back wings tend to tip-stall more readily. Forward sweep reduces tip-stalling, but it imposes heavy torsion loads on the wing structure.

Straight, untapered wings of



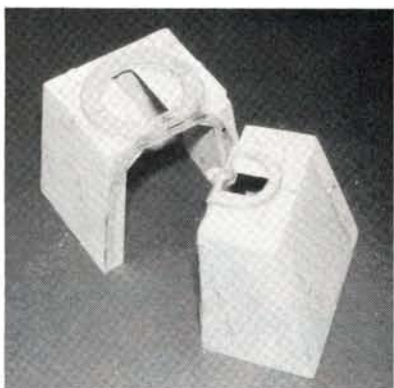
(University of Stuttgart, Germany; April 2, 1986)



AR of 6; use of the NASA "Safe-wing" leading-edge droop ahead of the ailerons (*Model Airplane News*, June '90) and hollowed balsa block wing tips are recommended.

Horizontal tail surfaces should have lower ARs (4 to 4.5) to keep chords above 5 inches and to avoid low  $R_n$  profile drag. Streamlined forms such as E168 have lower drag than 1/4-inch-thick sheet-balsa surfaces. By use of stress-skinned techniques they can be lighter and stronger.

For both wings and tail surfaces, avoid thick trailing edges; sand them to 1/16 inch thickness with rounded edges. Thick trailing edges have the same drag as wire landing-gear legs and are longer.



4. Outside view before shaping, externally and internally.

## ENGINE AND MUFFLER

Exposed engine cylinders and mufflers are major sources of drag. Fully exposed engines, firewalls and mufflers are even worse.

The J'Tec\* mufflers permit cowlings of both engine and muffler completely.

Photo no. 1 shows the installation of an O.S.\* Max .40 FSR engine and a J'Tec muffler. The exhaust stacks are made of 9/32-inch-o.d. aluminum tube. Note the 1/32-inch dia. phosphor-bronze glow-plug clip.

Photo no. 2 shows that the removeable portion of this cowl is secured by three Goldberg\* flat hold-downs, visible in the photo. These engage no. 2 shoulder screws (supplied with the hold-downs), two in the plywood firewall and one in the plywood ring behind the spinner.

The upper cowl is firmly cemented to the firewall. With the lower cowl removed, the engine, the glow plug, the carb and the engine control linkage are all exposed for servicing.

Lower cowl re-

moval requires only a sharp knuckle rap on the side opposite the muffler—it literally drops off! There's no tedious removal of the spinner, prop and several screws to remove the cowl!

To install the lower cowl, simply align the open sides of the three hold-downs with the three shoulder screws, and rap on the muffler side to engage the hold-downs on the screws.

Photos nos. 3 and 4 illustrate the construction of the cowl from 1/2-inch sheet balsa, some triangular balsa strips and five pieces of plywood. Two pieces of ply form the front spinner ring and the cooling air entry. A third ply piece, visible in photo no. 2, holds the two rear hold-downs, and two more form guides for shaping the cowl at the parting line between the upper and lower cowl parts.

This type of cowl has been used on several models powered by .40-.45 and .46ci engines with *absolutely no cooling problems*. The cooling entry is 1.25 square inches in area. The two cooling air outlets total 1.75 square inches, and they're at points of reduced air pressure on the fuselage sides (see photo no. 1). Remember, it's only the air that actually hits the engine cylinder that does the cooling. This thick balsa cowl also acts as a sound damper. Engine noise is noticeably reduced.

It's not necessary to remove the lower cowl to start the engine. Install a Radio Shack jack (no. 274-296) in the fuselage side, well away from that dangerous prop, and wire it (with no. 18-gauge, stranded, insulated wire) to the glow-plug clip and an engine-mounting bolt. This provides an on-board circuit that's energized by inserting a plug (Radio

## Table 2: Eppler E 168

NR	Chord Station X/T	Upper Surface YO/T	Lower Surface YU/T
1	1.00000	0.00000	0.00000
2	0.99893	0.00006	-0.00006
3	0.99572	0.00027	-0.00027
4	0.99039	0.00071	-0.00071
5	0.98296	0.00142	-0.00142
6	0.97347	0.00238	-0.00238
7	0.96194	0.00352	-0.00352
8	0.94844	0.00477	-0.00477
9	0.93301	0.00609	-0.00609
10	0.91573	0.00754	-0.00754
11	0.89668	0.00914	-0.00914
12	0.87592	0.01094	-0.01094
13	0.85355	0.01293	-0.01293
14	0.82967	0.01513	-0.01513
15	0.80438	0.01754	-0.01754
16	0.77779	0.02014	-0.02014
17	0.75000	0.02293	-0.02293
18	0.72114	0.02588	-0.02588
19	0.69134	0.02898	-0.02898
20	0.66072	0.03219	-0.03219
21	0.62941	0.03547	-0.03547
22	0.59755	0.03879	-0.03879
23	0.56526	0.04210	-0.04210
24	0.53270	0.04535	-0.04535
25	0.50000	0.04848	-0.04848
26	0.46730	0.05143	-0.05143
27	0.43474	0.05415	-0.05415
28	0.40245	0.05658	-0.05658
29	0.37059	0.05865	-0.05865
30	0.33928	0.06029	-0.06029
31	0.30866	0.06146	-0.06146
32	0.27886	0.06211	-0.06211
33	0.25000	0.06220	-0.06220
34	0.22221	0.06169	-0.06169
35	0.19562	0.06057	-0.06057
36	0.17033	0.05881	-0.05881
37	0.14645	0.05640	-0.05640
38	0.12408	0.05335	-0.05335
39	0.10332	0.04971	-0.04971
40	0.08427	0.04555	-0.04555
41	0.06699	0.04094	-0.04094
42	0.05156	0.03595	-0.03595
43	0.03806	0.03083	-0.03083
44	0.02653	0.02535	-0.02535
45	0.01704	0.01980	-0.01980
46	0.00961	0.01444	-0.01444
47	0.00428	0.00910	-0.00910
48	0.00107	0.00460	-0.00460
49	-0.00000	0.00000	0.00000

## Table 1: Eppler 197

Aerodynamic Zero  
-2.7 Degrees

Chord Station XU	Upper Surface YU	Chord Station XL	Lower Surface YL
.000	.000	.000	-.200
.318	.789	.279	-.640
1.104	1.683	1.164	-1.278
2.335	2.633	2.555	-1.893
3.996	3.600	4.438	-2.454
6.075	4.556	6.797	-2.945
8.551	5.478	9.610	-3.365
11.402	6.345	12.852	-3.706
14.599	7.139	16.493	-3.955
18.112	7.844	20.495	-4.125
21.902	8.442	24.818	-4.195
25.933	8.918	29.414	-4.185
30.159	9.250	34.231	-4.085
34.551	9.413	39.236	-3.855
39.085	9.394	44.415	-3.535
43.735	9.191	49.723	-3.165
48.474	8.806	55.091	-2.765
53.282	8.246	60.447	-2.365
58.146	7.542	65.718	-1.965
63.028	6.752	70.834	-1.595
67.860	5.920	75.725	-1.266
72.575	5.079	80.323	-.965
77.105	4.254	84.564	-.715
81.384	3.466	88.388	-.505
85.349	2.733	91.738	-.325
88.939	2.068	94.572	-.185
92.096	1.478	96.864	-.075
94.778	.960	98.572	-.009
96.960	.530	99.637	-.005
98.604	.219	100.000	.000
99.642	.050		
100.000	.000		

Shack no. 274-286) into the jack. That plug is wired to the external power source. This arrangement is a major safety feature.

Part 3 of this series on drag reduction will contain more information about drag reduction and some details about the Swift—a low-drag, slotted-flap-equipped model.

\*Here are the addresses of the companies mentioned in this article:  
J'Tec, 164 School St., Daly City, CA 94014.  
O.S.; distributed by Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61924.  
Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, IL 60651.







ROB WOOD

**T**HE FIRST RAYS of the rising sun crept over the still runway at Madera municipal airport, promising another scorching day. It was dawn like any other dawn, but by the time the sun had set on that sixth day of October, 1991, a new page had been written in R/C aviation history. A year and a half



Unlimited parking for unlimited racing. An aerial view of Madera airport shot from a Hughes 500 helicopter.

# SHOWDOWN AT MADERA



Robert Heitkamp and his Bronze-winning Sea Fury, no. 61. Vaillancourt plans were enlarged to 100 inches. The model is of built-up balsa and spruce, covered with 1-ounce glass cloth and finished with acrylic lacquer. Its 49.9 pound weight and 3 1/4-inch-thick wings limited speed. An unmodified Sachs 8.4 was taxed to the limit.

*The first annual Giant Scale Unlimited Races push miniature aircraft and pilots to the edge of technology and endurance*

of research, planning, construction and testing had come down to this: a \$25,000 purse, 15 aircraft, 15 pilots and three six-lap races around a three-pylon course at speeds of up to 150mph. Over 100 aircraft had begun the journey to Madera, CA, from across the U.S. and as far away as Norway, but by the time technical inspections had been completed, engine, gear, airframe and radio problems had whittled the field to 48. Time trials over the succeeding days further reduced the number to 34, and heat races had eliminated the rest. Now, only a few hours remained before the best of the best would be revealed.

**T**he competing aircraft in this event are limited to giant-scale models of racers

P-51 Mustang (A, D and H); F8F Bearcat; Douglas Skyraider; Hawker Sea Fury; F4U Cor-

Yak-11; Fiat G-59; and the entry that raced in '91 at Reno, the Pond Racer.

By August 27, 100 models had been registered for the races. The breakdown is as follows: P-51 Mustang (51); F8F Bearcat (7); F4U Corsair (2); P-47 Thunderbolt (4); P-38 Lightning (7); A-26 Invader (5); Tsunami (5); Hawker Sea Fury (6); P-39 Airacobra (2); P-63 Airacobra (4); F7F Tigercat (2); Yak (1); Pond Racer (4).

Thirty aircraft qualified for the heat races, with an additional four aircraft qualifying as alternates; by the end of the heat races, the number of aircraft that would



Kerry Sterner's 1/3-scale Pond Racer wasn't ready in time for the event. Designed by Burt Rutan for the Reno races, the full-scale Pond qualified in '91, but didn't finish. The 4.2 Sachs were polished and ported by Ace's Saw Shop in Portland, OR. The 37-inch racer is all fiberglass with graphite composite spars. It's 102 inches long and has a 105.5-inch span. It should be a major threat in '92.

attempt to race in the finals had been further reduced to 17, including 2 alternates. Of this total, 13 were Mustangs, with two Sea Furys, one P-39 and an A-26.



At the full-scale Reno Races, Pond Racer pilot Rick Brickert had engine problems throughout the four race days. The Racer qualified at 400mph. Photo by Stephen Dunham.

that have qualified at Reno since the races began 26 years ago. The 16 aircraft that have qualified to date are:

sair; A-26 Invader; P-63 and P-39 Airacobra; P-47 Thunderbolt; F7F Tigercat; P-38 Lightning; Tsunami; P-40 Warhawk;





**Racers line up on the flight line.**  
(Photo by Stephen Dunham.)

Ever since the National Air Races of the 1920s and '30s, the speed, spectacle and excitement of unlimited racing has earned a place for it as the nation's premier aeronautical sport. In the past 26 years, the annual races at Reno have been the testing ground for the fastest planes and the hottest pilots. It makes perfect sense, then, that Tom Easterday and Cliff Adams chose that venue as a stage on which to showcase the best of what R/C modeling has to offer, and anyone who was at Madera for this professionally and efficiently managed event will testify that the



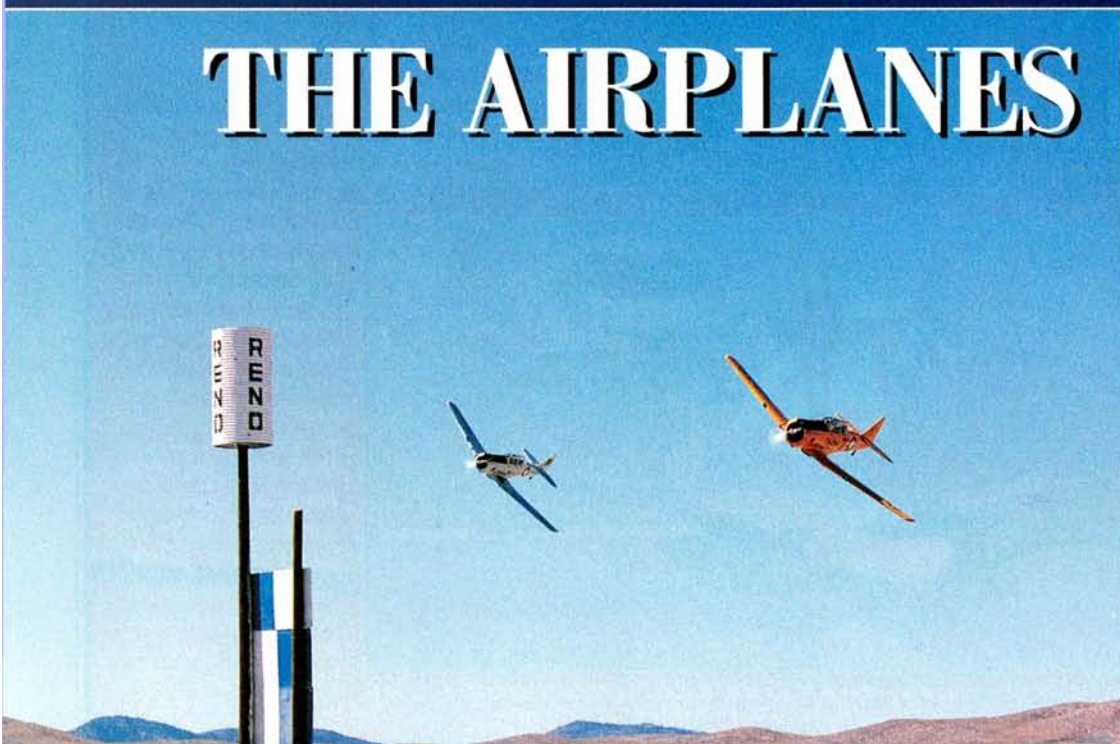
**Mark Smith prepares to fly.** The 2-cylinder English drone engine weighed 21 pounds; all-up weight was 53 pounds.  
Photo by Stephen Dunham.



◀ **Garland Hamilton readies his Yellow Aircraft Spitfire for launching.** Garland flew over 90 starts; racers formed up behind the pace plane until a puff of smoke and a sharp pull-up signaled the start of the race.

promoters succeeded beyond their wildest dreams.

# THE AIRPLANES



**Full-scale AT-6's 1990 Gold winner Tom Dwell (yellow plane) and no. 86 "Bad Company," piloted by Sherman Smoot, round the pylons at the '91 Reno races.** Photo by Stephen Dunham.

## THE RACES

An Unlimited Race isn't a fun fly. Neither an aircraft nor a pilot unused to sustained speeds in excess of 140mph is likely to fare well in this event. Balsa and plywood contraptions dragged across the sky at these speeds by unbalanced engines, spinners and props are doomed from the start. Thousands of hours spent in scale detailing resulted in some spectacular deposits found in dumpsters at the municipal airport, while simple, but strong, composite birds flew through the week and made it to the finals.

That's not to say that there weren't some beautiful airplanes with struc-

PHOTOS BY ROB WOOD



# R/C UNLIMITED RACES

tures to match: John Krohn's Sea Fury (no. 88) was a marvel that was beautifully finished on the outside. The

nearly perfect engineering of his engine, radio and internal exhaust installation earned him the Technical Excellence Award, hands down. Right on his heels, Robert Heitkamp's 1st-place Bronze Sea Fury was also a winner.

As the days wore on, pilots became comfortable with their aircraft and with the course, but the race exacted a toll. Two



Racers glisten in the sun as they wait for a chance at the \$25,000 purse.

engines separated from their fuselages and tried to fly, all by themselves; John Bolle's immaculate scale Dreadnaught Sea Fury self-destructed during qualifying; and Bridi's gorgeous F7F Tigercat lost an engine and dove straight into the ground during its third-round heat. Landing gear failed repeatedly on many aircraft, and this weakened their structures so that they were unable to continue; P-38s built from certain kits were too flimsy to compete; and, in one tragic case, a very heavy P-51 won a place in the final Gold only to be disqualified after repairs pushed it over the 55-pound limit.

"Do I have to do this?"—Cliff Adams. Cliff's Silver-winning Excalibur was built from Dave Platt plans. The P-51 has balsa-sheeted foam-core wings and a foam-core fuse. The entire airframe is covered with graphite and glass cloth and painted with automotive acrylic paint. The custom-built 6ci, 4-cylinder, 4-stroke engine started out as two O.S. Gemini 300s. The plane features a 22x16 Clark Airscrew prop and Robart retracts.



PEC's Hobbies P-38 undergoes technical inspection. The CBA kit, as built for the race, wasn't strong enough for competition wing stress and was later withdrawn. No P-38s raced this year.

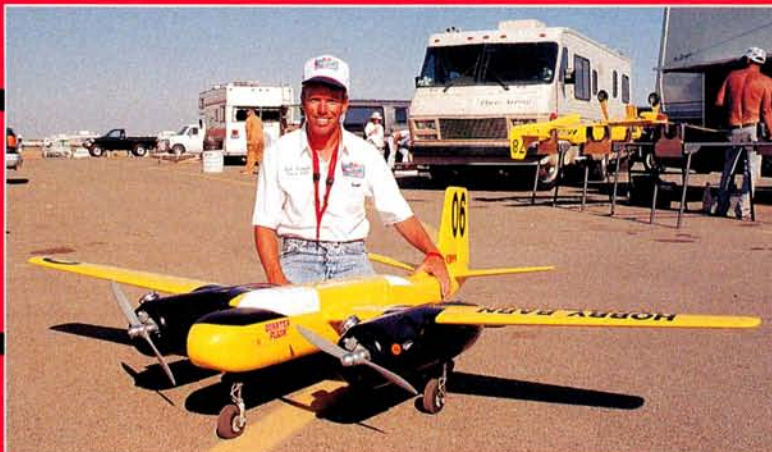
As the heat races began to reduce the pack to the final showdown, it was the flying, not the technology, that began to tell. Hotshot free-form pilots were edged out by steady, determined, consistent fliers. Two evenly matched airplanes would approach a pylon and start the turn; one would zoom up around the turn, while the other would maintain altitude. Guess which one crossed the finish line first? Pilots who flew too low to the ground had nowhere to go but up, and every time that happened,

## IN THE WINNERS' CIRCLE



Two Moki 1.8ci, glow, 2-stroke engines powered the A-26. Equal in size to the ST 3000, this 3.5-pound mill turns at 50 percent higher rpm.

**B**ill Hemple Jr. and Sr. set out to win the Gold at this year's R/C Unlimited Races. Realizing that the 100-inch-wingspan minimum might give an edge to a properly built twin, they searched through a history of the Reno races and discovered the A-26 Invader. Working from a set of Wylam three-views and data obtained from the Douglas Aircraft archives, the father and son



The A-26 Invader was built in six weeks by Jerry Kikkert. It weighs 27 pounds, has a fiberglass fuse and a 100-inch span. Estimated speed in Gold Final: 150+mph.

team joined forces with accomplished builder Jerry Kikkert to produce the 27-pound Invader.

Although the full-scale A-26 averaged only 289mph in the '85 Reno Races, the 100-inch version, powered by two Moki 1.8ci

glow engines, flew an estimated 150+mph in the final Gold race at Madera. The lightweight fiberglass fuselage, thin airfoil, tricycle landing gear and high power-to-weight ratios of the Moki mills made this entry an awesome contender. And, as Dan Parsons put it, "An outstanding pilot with equipment that works is hard to beat."



Dave Bridi is dwarfed by his Tigercat: 123-inch span, 55 pounds, two 4.2 Sachs engines. This fiberglass, balsa and foam airplane was majestic in the air, but it was destroyed in round 3 when one engine flamed out. Bridi will soon offer it as a kit.



air speed was lost. Pilots who flew a level course at a higher altitude had the option of diving down to the finish line, thus gaining a few mph on their competition.

Pilots such as Stinger Wallace, Bill Hempel, John Krohn and Cliff Adams flew their aircraft straight and true, and they were a joy to behold.

### THE MODELS

Prior to the races, there was much speculation as to the type of model most likely to win. While many people believed a twin-engine aircraft would have an edge (owing to total horsepower superiority and power-to-weight advantages), single-engine aircraft outnumbered the twins six to one. While their potential for greater speed wasn't in dispute, most teams felt that the potential for problems with the twins wasn't worth the gamble. The fact that a twin-engine A-26 won the Gold has many of the competing teams re-evaluating their thinking. By the end of the races, con-



John Krohn and team took 2nd place in Gold with this modified Sea Fury.

ventional wisdom was that *only* a twin could win.

Do the facts conclusively support this conclusion? It's true that the A-26 had the fastest estimated speed in the finals (152.3264mph); but it's also true that John Krohn's Sea Fury was only 6 seconds behind at 146.9148mph. In addition, Stinger Wallace's P-51 was clocked on radar during the heat races at 153mph. Who knows what the outcome would have been had Stinger's plane not lost its landing gear on takeoff in the final race?

On the other side of the argument, keep in mind that of the 16 twins registered, only one made it to the finals. Given enough

## THE LANDING GEAR

**T**here were very few pilots at Madera who didn't curse the manufacturers of their landing gear. Gear collapsed on landing; gear collapsed on takeoff; one gear was up and one gear was down. More than one airplane was seen flying inverted during form-up in a mostly vain attempt to get the gear to retract.



Stinger Wallace's "Stihlborn" fell victim to landing-gear failure in the final Gold race. The plane was clocked on radar during heat races at 153mph.

The number-one obvious

problem in the '91 competition was retractable landing gear. The number of aircraft cracking up on landing were too numerous to count. Robart was blamed; Gene Barton was blamed; scale wheels were blamed—the truth is, mostly the builders and pilots were to blame. The builders, for gluing retract mounting rails only to foam, and then mounting 1/5-scale landing gear on 1/4-scale miniature aircraft; and the pilots, many of whom hadn't flown their aircraft more than the required four flights prior to arriving at Madera.

A P-51 Mustang is notorious for landing and ground-handling problems. It takes practice to land a P-51 successfully, flight after flight. While it's true that the runway was narrow, with yucca plants and other obstacles bordering it, the truth is that many of the aircraft touched down directly in front of the pilots, at speeds in excess of 60mph! Since many flap servos had been sacrificed to save weight, too many times an aircraft would make an apparently perfect touchdown, only to run off the runway a hundred yards farther down the ramp. Stinger Wallace had the right idea: line up your approach, and then cut your engine.



Dejection is evident in John Eaton's face as he considers going into the retract business after round 5. He later flew his P-51 to 2nd place in Bronze. Photo by Neil Davis.



# R/C UNLIMITED RACES

time to perfect, a P-38 could very well win next year; and then there's the Pond Racer, which wasn't ready for this year's effort. Looking at photos of Kerry Sterner's awesome creation at Madera, I wonder.

## RADIOS

Top-of-the-line radios were in abundance, as might be expected. RCD receivers and servos were very popular, as were computerized JR, Hitec, Airtronics and Futaba transmitters. According to John Elliot (CD for the event), radio installation was the single largest problem the aircraft had in passing technical inspection. The tech inspections were rigorous, but not unreasonable. With the engine running at full throttle, the transmitter was range-checked at 150 feet in the presence of known interference. The radios themselves weren't the problem. In many cases, engine noise generated radio interference, servo leads were too long for receiver out-

put, or wires ran too close to internally mounted tuned pipes and were literally fried. Most of these problems were corrected, and lessons were learned.

## TROPHY RACE STANDINGS—1991 R/C UNLIMITED AIR RACE

AIRPLANE	PILOT	POSITION	RACE NO.	LAP TIME	EST. SPEED MPH
A-26	Bill Hempel	1st Gold	06	108.3200	152.3264
Sea Fury	John Krohn	2nd Gold	88	112.3100	146.9148*
P-39	Ken Trainor	3rd Gold	87	133.8700	123.2539
P-51	Brian Richmond	4th Gold	053	115.9400	142.3150
P-51	Tom Strom	5th Gold	53	138.1400	119.4440**
P-51	Cliff Adams	1st Silver	2	126.1200	130.8278
P-51	Rodger Grotheer	2nd Silver	13	144.0900	114.5118
P-51	Frank McCrindle	3rd Silver	24	157.0900	105.0353
P-51	Reno Clark	4th Silver	05	157.1700	104.9819
P-51	Tom Cone	5th Silver	9	200.7200	82.20407
Sea Fury	Robert Heitkamp	1st Bronze	61	135.9700	121.3503
P-51	John Eaton	2nd Bronze	52	139.7500	118.0680
P-51	Sherman McCoy	3rd Bronze	96	146.7800	112.4131
P-51	Larry Skiles	DNF: Midair	78		
P-51	Larry Sutherland	DNF: Midair	90		

\* Flew as alternate to Stinger Wallace, when no. 47 gear failed on takeoff.

\*\* Flew as alternate to Mark Smith, when no. 83 disqualified for weight.

# STATE OF THE ART V

Competing teams and lone pilots came from all over the world and from all walks of life to battle it out at the R/C Unlimited Races. Dave Abbe and Team RCD represent one end of the spectrum, while Stinger Wallace and his band of Renegade Monster Modelers reflect the other end. Throughout the heat races, the competitors were evenly matched, with Dave's no. 053 clinching the number-two slot with 41 points, and Stinger's no. 47 right behind with 38 points.

By profiling these two radically different approaches to racing, I hope to give the reader a taste of what it's all about.

## DAVE ABBE

As CEO of RCD Inc., Dave has

ready access to the best of R/C technology. When Cliff Adams and Tom Easterday announced the likelihood of a Reno-style race for giant scale, Dave immediately saw an opportunity to advance R/C aviation to a level of professional sport, and he began his search for the best kit, engine and mechanical elements available. After reading an article on the Unlimited Races in the August issue of *Model Airplane News*, Dave contacted Alan Stanford of Sky Aviation, in Montreal, to arrange delivery of two Stiletto kits. In fact, the kit pictured in that issue is one of the two that Team RCD flew in the races. When a stock engine mount wasn't to be found for his

Husqvarna engines, Dave flew to Houston, TX, to meet with Bob Obenberger of Tru-Turn. Two days

kits began. Meanwhile, Dave began to gather such disparate elements as retract gear from Australia (with 10 pairs of oleos for spares), custom-built ignition and exhaust systems (which Dave helped design just for the races), optical isolators for the servos, etc.

Dave Summed it up on the phone: "This type of race separated the men from the boys, who recognized that they were building a miniature aircraft, rather than a model airplane. Construction was primary." Dave Abbe's motive in spending all that time and money? He wrote, "These two planes helped prove the eminent success of the R/C Unlimited Race as a premier event whose effect on

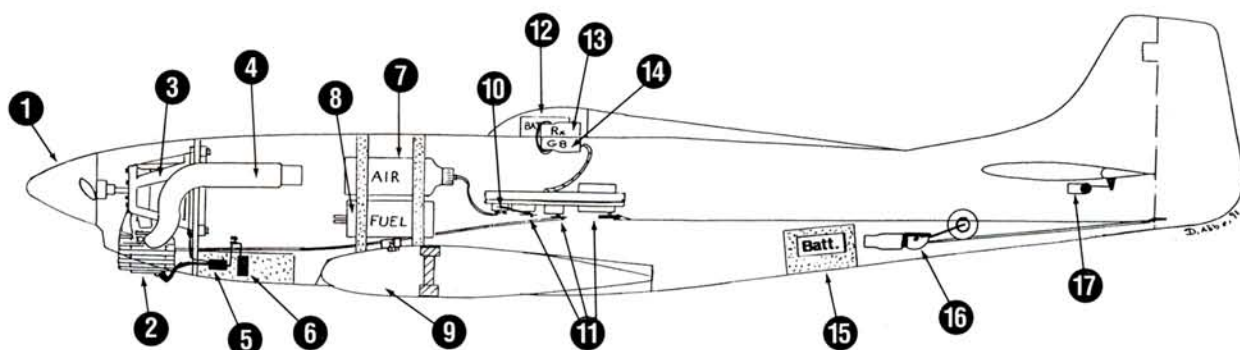
Dave Abbe's RCD team, responsible for winning 4th and 5th place in Gold, pose behind their Stiletto Mustangs. Airframes were provided by Sky Aviation. (Photo by Neil Davis.)



and \$8,000+ later, Dave had his mounts and spinners.

Having enlisted the services of Jim Miller, construction of the two





### PROFILE OF A CONTENDER

Dave Abbe, of Team RCD, spent a great deal of time and money on two entries in the Gold—no. 53 and no. 053. Starting with a Sky Aviation Stiletto, he put together two outstanding aircraft.

- |  |   |   |
|--|---|---|
| 1. 6-inch Tru-Turn aluminum spinner  | 6. SR 6V, 900mAh ignition battery             | 13. RCD bulletproof FM receiver                           |
| 2. Front-mounted Husqvarna 119cc engine  | 7. 7-Up, 1-liter plastic air tank             | 14. Jomar Products Glitch-Buster Opto-Isolator for servos |
| 3. Tru-Turn custom radial mount  | 8. Sullivan 32-ounce fuel tank                | 15. SR 6V, 1800mAh servo battery                          |
| 4. Unique Metal Products exhaust manifold with Glas/Pak  | 9. J.M. Innovations main retracts (not shown) | 16. B&D retractable tail wheel                            |
| 5. Tran-Sil Silent Spark ignition with High-Sky Electronics 2-speed auto-advance ignition timing | 10. B&D retract valve                         | 17. Hobby Dynamics elevator servo                         |
|  | 11. RCD/Hitec servos                          |   |
|  | 12. SR 6V, 600mAh receiver battery            |   |

### COMEBACK-OF-THE-YEAR AWARD

John Krohn, flying his twin Quadra 50-powered Sea Fury, deserved yet another award in addition to his 2nd-place Gold and Technical Excellence Award. The top qualifier, Krohn's Sea Fury was beset with me-

chanical problems in his second heat and failed to win any points. That zero bumped him out of the Gold competition, but it earned him a spot as alternate. When Stinger Wallace lost his gear on takeoff, Krohn took his place and went on to take 2nd. A tremendous effort, John!

# S. SEAT OF THE PANTS

the growth of the R/C sport will place it in a class above most other R/C sporting events."

### STINGER WALLACE

Once labeled by Don Lowe as a "Renegade Monster Modeler" for his flamboyant and sometimes radical style, Stinger nevertheless is the "modelers' modeler." Hailing from east Texas, Stinger lives 200 miles from the nearest hobby shop. Everything he and his team put together was obtained through the mail. Stinger scratch-built his Stiletto from modified Ziroli plans in six weeks and found a competition chainsaw customizer in Louisiana

by the name of James George, who had never heard of giant-scale

P-51 capable of flying 153mph.

Linking up with some of his east Texas buddies, Stinger made the long trek to Madera to compete. From the moment the team arrived, determination and sportsmanship ruled. The Texans transformed one of their motel rooms at Madera Valley Inn into a complete workshop, with a drill-press, bandsaw and belt/disk sander. Into the wee hours of the morning the team worked to repair and modify their airplanes and never gave up.

As Stinger put it, "We came to race. If we win, that's great. If we don't win, that's OK, too—as long

as we enjoy ourselves. What good is it if you don't have fun?" And fun they had—Stinger was a contender right up until the final Gold race, when his landing gear failed. Will he be back next year? Count on it.

What can we learn from our study? Does it take a lot of money and technology to compete in these races? Not so far, anyway. Is one approach better than another? Again, the answer is no. Stinger is an inspiration to average modelers with modest budgets but possessing fighting spirits. Dave Abbe will be instrumental in developing the types of product a guy like Stinger can order through the mail. Together, Dave and Stinger capture the soul and heart of the adventure of R/C Unlimited Racing.

James George, Scott Broughton and Stinger Wallace on the flight line.



airplanes. One thing he *did* know was chainsaw engines. The two of them got together and produced an essentially standard equipped



# THE CONTROVERSIES

In a competitive environment, emotions can run very high over a variety of issues. Complaints about rules changes implemented after the qualifying began, the substitution of the airport taxi-way for the main runway, and the proximity of the course to pilots and spectators were a few of the concerns.

By far, most of grumbling was centered on the A-26 flown by Bill Hempel. Double-checking by race officials after protests were lodged confirmed that the A-26 did indeed meet the minimum specs for qualification. No one faulted Bill's flying, which was outstanding, to say the least. The arguments against the A-26 (90 letters, as of this writing) have more to do with spirit than with law.

The heart of the matter seems to be that this event was designed to capture, in miniature, the look, the feel and the excitement of the full-scale Reno races. Although scale considerations were limited to outline, most of the aircraft looked quite realistic in the air. The other twin-engine aircraft, such as Bridi's F7F Tigercat, were of sufficient size to "feel" right as they flew in the pack of single-engine fighters. The prevailing sentiment was that Hempel's glow-powered A-26 looked like a "model airplane," rather than a miniature aircraft, especially when flying wing-to-wing with John Krohn's 2nd-place Gold winner no. 88, a 54-pound Sea Fury.

Exactly what is the problem with the A-26? The Hobby Barn team chose a subject that could be built light, fast and tough. The model met all of the requirements for the competition, i.e., it was accurate in scale outline, it had a 100-inch wingspan and it was structurally and mechanically sound. To pin down the root of this controversy, the question of scale, especially as it relates to perception, must be addressed more fully.

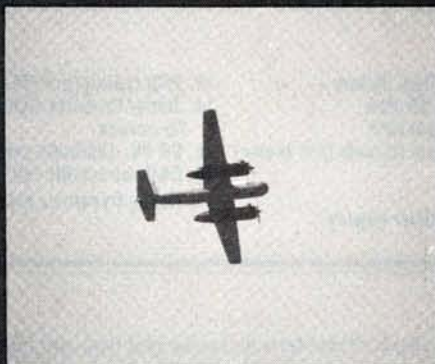
The pilots and spectators I spoke with generally agreed that the appeal of this type of race is centered on the approximation of "the real thing," i.e., classic WW II fighters battling it out for the Gold

in a grueling test of endurance for pilot and airplane. Although twin-engine fighters, and even a C-47, have competed at Reno, none has ever been a threat to the Sea Fury or the Mustang, largely owing to structural limitations in high-G turns. A full-scale A-26 has a 70-foot wingspan; a P-38, a 52-foot wingspan; a Tigercat, a 45-foot wingspan. Yet, a full-scale P-51 measures 37 feet wingtip to wingtip.

Thus, a 1/4-scale Mustang would have a 111-inch span, before clipping, while a 1/4-scale A-26 would measure 17 feet, 6 inches! If the R/C Unlimited Races were limited to 1/4-scale, there would be no twin-engine warbirds competing, as the smallest of these, the F7F, would have a 13-foot span, and

would clearly exceed the 55-pound weight limit. On the other hand, a 1/3-scale Pond Racer has a 101-inch wingspan, and a 1/4-scale Pond would look like a "model airplane" (and would probably win every race). If scale were limited to 1/8 to allow the twins to compete, the single-engine fighters would look and sound like toys, and nobody would be happy.

Another point that deserves consideration is the changing face of the full-scale Reno Races: the warbirds are wearing out. There were so many crashes of WW II fighters in 1990 at various events around the country that the future of these venerable aircraft as racers is in serious doubt. The new breed of Reno racer may very well be represented by an all-composite, high-tech twin such as the Pond Racer. If the rules for the R/C event remain the same, eventually the Pond Racer type of entry will be the norm, while the P-51 will be a nostalgic oddity. I don't think anyone wants to see that happen, yet there doesn't seem to be a satisfactory solution to any of these problems. Once the promoters begin to make restrictions, the races will no longer be "unlimited," and will, instead, be some sort of historical re-enactment of yesteryear's races. We'll have to await the decisions of the R/C Unlimited staff.



Bill Hempel's winning A-26 Invader. (Photo by Dan Parsons.)

# R/C UNLIM

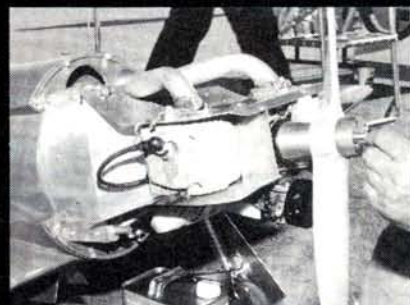


Frank McCrindle drove this Canadian Team Impact no. 24 to a Silver win in round 5, heat 5. He went on to place 3rd in the Silver finals.

## THE FUTURE

By organizing and promoting the Unlimited Races, Cliff Adams and Tom Easterday have raised a hobby to the level of a professional sport.

Many of the competing aircraft were sponsored, in part, by R/C manufacturers, many of whom were on the scene to help out and, in some cases, to take the flak for products that weren't quite up to the punishment demanded of them. To their credit, many of those manufacturers are hard at work upgrading their products for next year, to the ultimate benefit of all R/C enthusiasts.



The winner of the Technical Excellence award, John Krohn's Sea Fury entered the final Gold race and took 2nd. A 12ci, 200cc, 2-stroke Aero Quadra twin turned a 24x20 prop. Both cylinders of this internally piped engine fire at the same time. Shortening the header increased rpm by 200.

**P**ower! Horsepower! Glow-powered or gas-powered, the engines were thought to be the keys to winning. The powerplants ranged from Moki 1.8s to Cliff Adams' custom 4-cylinder, 4-stroke O.S.; from a Sachs 5.8 running on pure alcohol to 200cc, Quadra .50 twins; from stock G62s to a 21-pound English drone engine. Throughout the week, racing



# TED RACES

As dedicated as Easterday and Adams are, the Unlimited Races couldn't have succeeded without the untiring efforts of a host of volunteers: Dave Berry, who donated the helicopter and T-34 for rides and aerial camera shots; Sam Wright, whose voice never gave out during four days of announcing; Airtronics representatives, who manned the impound booth for two days; John Elliot, who, as CD, kept the planes moving in the air and on the ground; Cal Orr, Rick Fick, Gail Bushnell, Bonnie Wilber, Loraine Hartranft and a host of others who provided a smooth and professional background for this most exciting drama. Here's to 1992 at Madera!

*As with any evolving sport, the rules for giant-scale racing are destined to change with time. Racing staffers were dealing with controversial issues even as the magazine deadline came and went. Questions about twin-engine restrictions, engine weight limitations, and even the site for '92 had yet to be answered. For up-to-date information, contact: R/C Unlimited Racing, 565 Mercury Ln., Brea, CA 92621.*

## TO WIN IN '92

If you plan to enter the competition this year, and you want a good shot at the Gold, there are some qualifications you and your aircraft will have to meet. I can't say that I have a magic formula, or that I know what kit, engine, or type of aircraft will win. I'd say these are the minimum requirements.

1. An engine and an airframe capable of sustaining speeds of 150mph or more for 10 minutes at a time, on demand, pulling approximately 25 Gs in the turns (two models and engines—one for practice, one for racing). The engine must start easily, idle reliably, and be nearly perfect in balance, with a precision-turned spinner. You should have one extra engine (broken in) and one extra spinner for each aircraft. The ignition system should function without producing RF interference at more than 8,500rpm.

2. Its total weight, wet, should be less than 50 pounds (to allow for repairs).

3. The landing gear should be able to withstand a 100-pound load and there should be nine pairs of oleo struts and wheels for each airplane, with several extra sets of gear blocks. The gear must have positive lock-down (mechanical preferred over air-actuated).

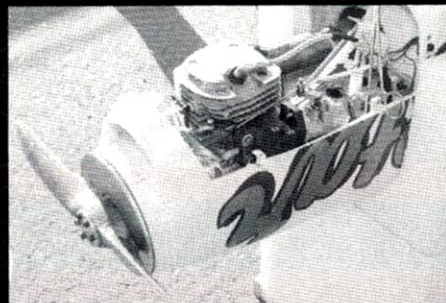
4. The programmable radio should have flexible mixing options.

5. Unless you're independently wealthy, find sponsors to help pay for all of the above, plus transportation, meals and lodging.

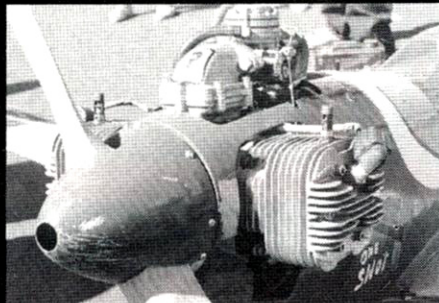
6. Find a pilot who is cool, calm and steady, and who is used to flying a miniature aircraft in close proximity to others. He should have at least 25 flights on an aircraft that's similar or identical to the contest entry.

7. Put together a team of not less than four people (excluding the pilot) who have practiced together in contest conditions, and who can stand being around each other constantly for five or six days.

6. Finally, your will to win should be balanced with a strong dose of sportsmanship and a well-developed sense of humor.



Ace's Saw Shop modified this A&M Sachs 5.8 chainsaw engine for the races. A Tillitson carb, enlarged ports, a timing change and an alcohol/nitro/Klotz fuel mixture produce approximately 18hp at 9,000rpm. A 20x22 prop at that speed approaches the sound barrier, creates excessive vibration and shears prop bolts. No. 44 was flown by Dick Sizer.



No. 83 is a P-51 Mustang, believe it or not. After winning a place in the final Gold, this plane was disqualified when Mark Smith added 3 pounds to its tail to balance this 53-pound monster. The plane is powered by a 2-cylinder drone engine.



Engine vibration caused the tail of Howard Young's beautiful P-47 to separate from the fuselage during the third heat. Vibration was a major cause of crashes throughout the week.

teams worked into the wee hours to increase rpm by modifying props and reworking fuel mixtures.

Never in the history of R/C aviation have so many worked so long to gain so few mph! Important point: the 2nd-place Gold, no. 88, weighed nearly twice as much as the winner—yet, only 5mph separated their top estimated speeds. Another important point: the

winner of each class ran more than one cylinder. It appears that multi-cylinders provide a smoother powerplant; a smoother powerplant

results in less vibration; less vibration results in a longer life for the airframe.

## THE ENGINES





Keith Shaw (Ann Harbor, MI) always impresses the crowds with his fine scale models. This year, it was a 1/4-scale Percival Mew Gull—winner of the 1938 British King's Cup trophy for pylon racing. Span, 75 inches; Astro Cobalt 60 sport wind; 13x10 prop turns at 9,000rpm; 28, 1200 Sanyo cells. Model features full cockpit details with pilot and split flaps.

Author Bill Griggs (left) and Walt Bub. Both planes are Holley's Home-builts. Walt's plane has a geared Astro .05 Cobalt motor on seven 1200mAh batteries, an 11x7 prop, a Jomar SM5 speed controller and a foam wing (relaxing). Bill's has a built-up construction and is powered by an Astro .15 geared motor on 10 cells (over-powered).



The  
biggest  
electric  
fun-fly



gets  
bigger



Art Thoms built this Gigantic Custom Priveteer, which was designed in 1946 by Don McGovern. It flew free-flight with a Fox .58. Art used John Pond's plans and converted to a geared .40 Cobalt with 21 cells and a 12x8 prop. It uses a Jomar SM6 and is covered in silk and dope. This slow, gentle flier always draws a crowd.

# 1991 KRC

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► Steve Neu with his SE-X, which he designed with Jerry Bridgeman. (They're both members of the USA F3E team.) Steve will compete next year in Holland for the world championships. This is a full composite ship. Its motor delivers approximately 10.5 pounds of thrust for 1 minute, 10 seconds of full power at 60 to 65 amps (no fuse, obviously). It weighs approximately 5.5 pounds (2.5 kilos) and is powered by an Astro 60 FAI and 27 900mAh Sanyo cells. Its wingspan is about 70 inches and its area about 520 square inches. Controls are elevator and ailerons and semi-crow landing compensation. An Airtronics Vision radio does all the mixing.



► Russ Pribanic (New Milford, CT) designed the OR Watt competition fun-fly machine. It has an Astro FAI .15 geared motor; 10, 1400mAh batteries; and a 12x9 prop. Weight—59 ounces. This plane competed against gas ships and gave them a run for their money. These planes are the newest trend in electrics.

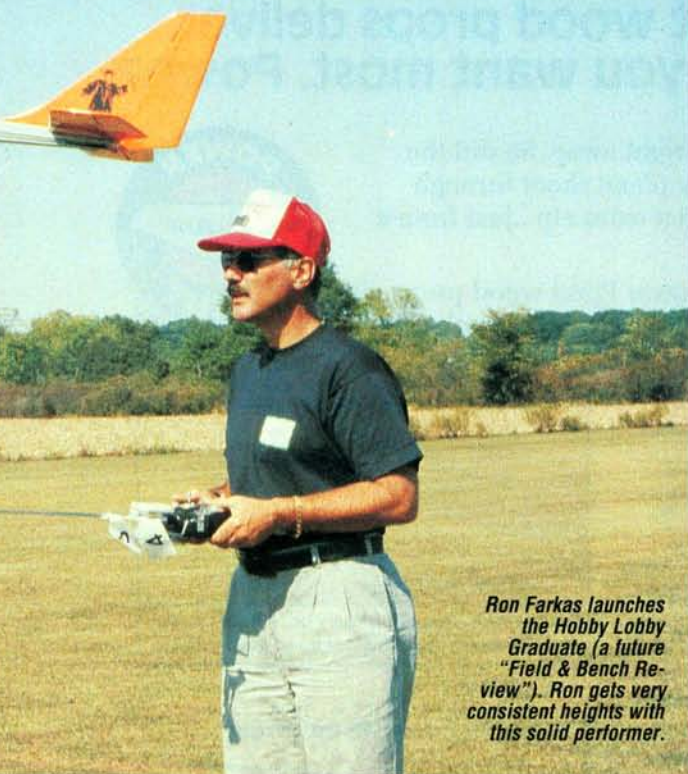


PHOTOS BY BILL GRIGGS





Gary Kagel of Queens, NY, converted an X-Cell helicopter to electric. He used an X-Cell 40 frame with an X-Cell 50 power train and rotors. Astro FAI 40; 24 cells; Astro marine speed controller. Gear ratio was changed to 11:1 to get a 26A draw.



Ron Farkas launches the Hobby Lobby Graduate (a future "Field & Bench Review"). Ron gets very consistent heights with this solid performer.



Ellis Grumer (Fallsberg, NJ) showed us two gorgeous original biplanes: the Grandson Bipe—15 geared 14 cells; and the Grandson .40 with an Astro .40 and 21, 1800mAh SR magnum batteries.

**I**T HAPPENS every September. Somehow, miraculously, a rural area in Pennsylvania is transformed into the center of the universe. People travel from all corners of the earth to stand in a field, stare with wonder into the sky and listen to the whispering of far-away props.

In perfect weather, the Keystone Radio Control Club hosted its 12th Annual Electric Fly on the weekend of September 21, '91, in Quakertown, PA. The attendance was up by over 15 percent (approximately 160 entrants). People traveled from as far as Great Britain and France to share the knowledge and enjoy the spectacle of it all.

# T R I C

► This Electra-lite <sup>3</sup>/<sub>4</sub>-scaled-down Goldberg Elektra is by "Killer" John Fleming of Liverpool, NY. Mabuchi 400 on Mini Olympus gearbox; Scimitar 8x4.5 prop; span—58 inches; weight—25 ounces. Flight times nothing under 23 minutes; longest was 31 minutes with 3 minutes of charge left.



► Competition fun-fly models are popping up all over. John McCollough (Raleigh, NC) converted an Air Flairs Sticket 4 to electric using an Astro Cobalt FAI 15 on 10, 1200mAh cells in the wing leading edge. John shortened the tail boom by <sup>1</sup>/<sub>2</sub> inch and extended the nose by <sup>1</sup>/<sub>2</sub> inch from stock.



by BILL GRIGGS



Below: Ed Berchtold (New Jersey) converted this Sig Ninja to accept a .15 Astro Cobalt and 12, 800mAh AR cells. Weight—3.5 pounds. The only modification necessary is to widen the nose. Has also flown with .05 Cobalt on seven cells.



Above: Christopher True's (Peekskill, NY) new Robbe Dornier twin: two Keller 25/15 motors; 14 1.2mAh SCR; weight—6.25 pounds; wing loading—36 ounces/square foot.



Above: Alvin Yegel (Bridgeport, CT) designed the Whizzpurr 40 for all-out performance. An Astro .40 FAI motor supplies the get up and go on 18, 900mAh Sanyo SCR cells. Vertical power for days. Hang on!

## SATURDAY ELECTRIC FLY WINNERS

### 20 Loops—Fastest

- 1 Russ Pribanic
- 2 Dave Baron
- 3 Don Belfort

Aircraft	Time (mins:secs)
Watt—own design	58 secs
Son of Smith (83%)	1:4
OR Watt	1:18

### Barnstorming

- 1 Russ Pribanic
- 2 Dave Baron
- 3 Chris True

Watt - own design	16:06
Son of Smith (83%)	16:11
Electro Streak	27:25

### Best Scale

- 1 Keith Shaw
- 2 Carl Small
- 3 Everett Rubendunst

Percival Mew Gull
Morrissey Bravo
Curtis Pusher

### Pilots' Choice

- 1 Steve Neu
- 2 Keith Shaw
- 3 Ron Farkas

F3E
Percival Mew Gull
4 Star 40

## SUNDAY ELECTRIC FLY WINNERS

### 30 Rolls—Fastest Time

- 1 Dave Baron
- 2 Russ Pribanic
- 3 Martin Irvin

Aircraft	Time
Florio Stunt Wagon	22:56
Watt—Own design	40:78
Tube—E	1:5.12

### All Up—Last Down

- 1 John McCullough\*
- 2 Karl Benson\*\*
- 3 Duane Fleming\*\*\*

ONO McCullough Special	52 mins
80" Playboy	50:15
Goldberg Electra	24:35

### Best Old-Timer

- 1 Gerhard Spielmans
- 2 Al Yeagle
- 3 Karl Benson

Viking Phoenix
Buzzard Bombshell
Quaker 84"

### Pilots' Choice

- 1 Ellis Grummer
- 2 Keith Shaw
- 3 Martin Irvin

Curtis Seagull
Stearman
Fokker D-VIII

\*ONO McCullough Special: 2 meter; 48 oz., 10.5 oz./sq.ft. wing loading; 2 Sanyo AE 1200mAh packs (series and parallel by switching—3.6 and 7.2 volts); geared Leisure .05; Graupner 15-inch folder.

\*\*80-inch Playboy: 60 oz., Astro cobalt geared 15; 10 SR 1800mAh cells.

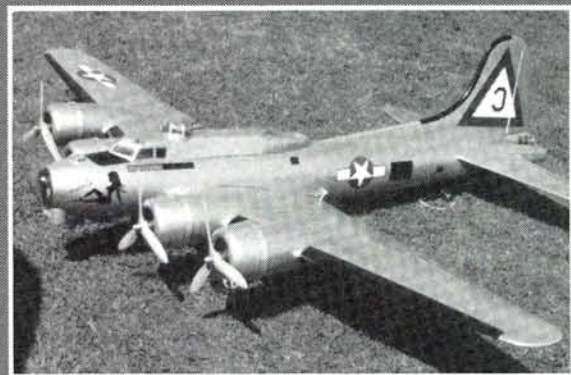
\*\*\*Goldberg Electra: .05 Thrustmaster motor; 8x4 Master Airscrew; 7-cell 1500mAh pack.

## 1991 KRC ELECTRIC FLY

This year, a growing trend was evident. More and more electric fliers build planes that perform exactly like gas planes, or they convert existing designs to electric. With the availability of data on electric-power systems and general airframe design, more and more modelers are converting existing glow designs to electric or tackling difficult scale projects—and with great success. Electrics are no longer mostly gliders and trainers.

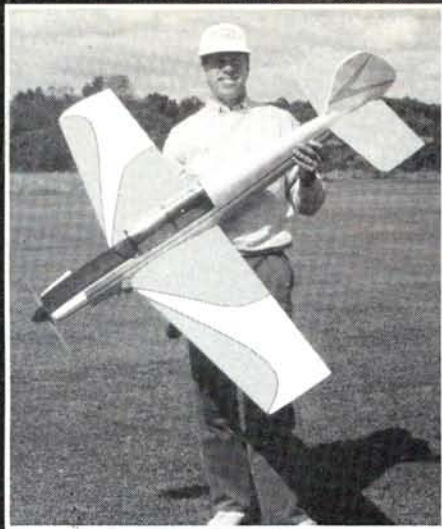
Competition fun-fly ships are naturals for electric power. This year, there were eight of them at KRC, and they ruled the "skill" events. David Baron and Russ Pribanic were tough to beat. They took the top two places in three events with three different fun-fly ships.

Steve Neu, a member of the United States F3E team, traveled all the way from San Diego, CA, to show us Easterners what power is all about. Neu electrified (pun intended) the crowd with the sheer



Joe Beshar (Oradell, NJ) modeled this B-17G after the one he flew in WW II (303rd Bomb Group, 358th Squadron, 8th Air Force). The model Flying Fortress B-17G spans 78 inches, has a wing area of 5.36 square feet, a wing loading of 24.8 ounces/square foot, and weighs 8 pounds, 4 ounces. It's powered by four Astro .035 Cobalt geared motors and 24, 800mAh cells.

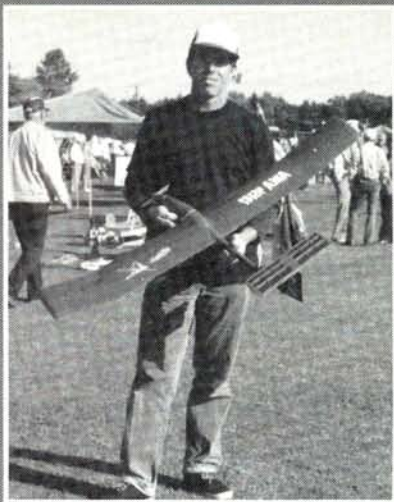




Bob Rumsey (Randolph, NJ) with his Model Products' Dalotel, Astro .60 pattern wind; it has the new sleeve on the motor, 28 cells, Zinger 13x6x10 prop; weight—9 pounds, 14 ounces; area—850 square inches; Jomar SC4 speed controller that's modified to carry the higher cell count and Futaba PCM radio.



Don Belfort of Clay, NY, is expert at converting power ships to electric. Here's his "OR Wait" by Walt Moucha Models, Astro Cobalt geared 40; 20, 900mAh cells; 12x10 APC prop; weight—6 pounds. Don also converted a Royal Midi Zero—lightened and slightly modified with a geared 15 FAI, 10 1500 mAh batteries, 10x9 APC prop, retracts and simulated machine guns. Weight—68 ounces.



Tom Hunt (T/Center Reach Long Island, NY) showed us the SEFL Consortium—originally a hand-launcher that's converted to electric with a Mabuchi RF380 20W motor and a 6x3 Cox prop. Turns 9,000rpm for 3.5 minutes on a 5-cell 450mAh pack; 23 ounces up from 16 ounces. Weight—21 ounces with a BEC.

power of his SE-X (Snipe Electric, model 10) F3E glider. This plane was awesome. It went vertical from a hand-launch and was out of sight in 4 seconds. For me, this was truly the highlight of the event.

### FREQUENCY CONTROL

For many at the KRC meet, frequency control was like being at a candy store counter with a pocketful of change but no sales clerk in sight. Unfortunately, it wasn't uncommon to wait for hours before getting the frequency paddle. Each of the 10 paddles had five frequencies—not sequential, but chosen to minimize third-order intermodulation. Each paddle was restricted to a specific flight box on the flight line. Although the system worked well in terms of eliminating radio problems, the KRC planners are reportedly taking steps to ensure better access to frequency pins at the next Electric Fly.

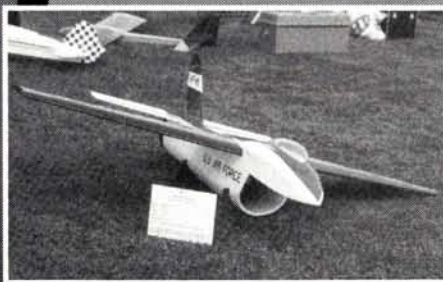
No KRC would be complete without the Saturday-night banquet—always a sell-out. This was a chance for everyone to get together and just talk and have fun. Next year, the banquet will be moved to larger facilities to allow more people to attend.

The members of the KRC club and all of the manufacturers who help sponsors are to be commended for their efforts. I look forward to attending my eighth KRC next year. ■

## 1991 KRC ELECTRIC

# FLY

Right: Everett Rubendunst came from Foster, RI, with his modified Guillows Aeronca. The model featured functional wing struts and a 68-inch span, and it weighs 41 ounces. Power comes from an Astro Cobalt .035 geared motor, turning a Top Flight 12x6 wooden prop (six SR 1800 batteries). Everett gets 12 minutes of run time at 6 amps, and he placed 4th in All Up—Last Down with this combination.



Left: Earl Brightbill (Rosewell, GA) had a stand-way-off-scale model YF-16 ducted-fan electric. Span—50.25 inches; area—463 square inches; weight—63 ounces; wing loading—19.7 ounces/square foot; Astro Cobalt 15, 14 800mAh SCR; Benson SC2 controller. It originally appeared in the July 1980 "Model Aviation." It has an Astro .15 direct drive with Tornado 7x6 three-blade prop cut down to 5 inches (inside diameter of duct). Inlet diameter is 5 inches; tail outlet is 4.5 inches. The span was enlarged from 36 inches to 50.25 inches. Turns at 13,700rpm.

Right: Joe Ulas's Ligeti Stratos still hasn't flown. The Stratos is the result of a collaboration between the author, Walt Bub and Joe Ulas. Power is supplied by a Marx 300/10 motor with 14 cells and a Jomar SM6 speed controller. It's very fast on the ground! When the bugs have been worked out, the plane will be featured as a construction article in "Model Airplane News" with an Astro Cobalt 40 FAI and 18 cells.





# ENGINE EVALUATION

by MIKE BILLINTON

## SUPER TIGRE S45K ABC

**T**HE SUPER TIGRE S45K R/C sport engine will make sense to many modelers. At a cylinder size of almost .46ci, it comes somewhere between the extremes of the O.S. .91 fan engine and the USA's fabled Shuriken .051, but it's different because of its middle-of-the-road price, size and performance.

In its ABC and full Schnuerle-ported forms, this sport engine is a strong performer. Having "stretched" the bore and stroke of an existing engine with a smaller capacity, Super Tigre has produced an engine with a surprisingly high torque-to-weight ratio. This ratio is now significant in much sport modeling activity. The lower-rpm-equals-less-noise equation has led manufacturers to improve torque at lower rpm, instead of always going with noisier, high-rpm-related horsepower levels.

When testing the S45K, I noticed a rather unusual feature: "flat top" to horsepower peak points in each of the four configurations tested (muffler, pipe, etc.).

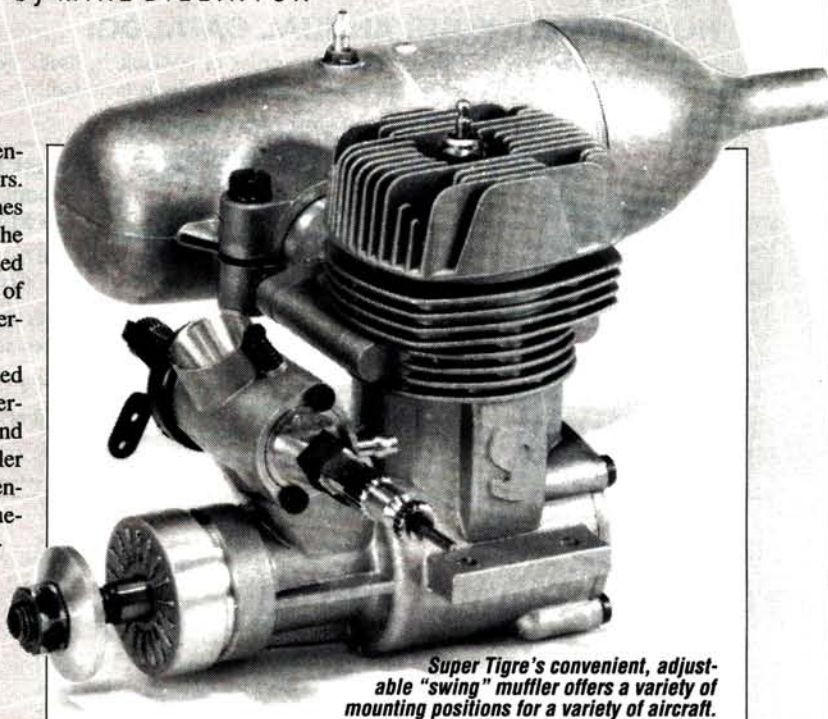
### MECHANICAL FEATURES

The Super Tigre S45K's construction and materials embody the company's unflinching high standards.

The solid, one-piece crankcase has the K-style extended cylinder finning at its rear. The brass cylinder liner has Super Tigre's usual thick upper flange and a chromed interior with a .002-inch bore taper. Made of high-silicon alloy, the plain piston weighs only 8 grams. The piston-to-liner fit shows a typical ABC "nip" at top dead center (TDC). As the piston at TDC is flush with the top of the liner, so the K-style cylinder head sits atop the liner (unlike the more usual plug-in-type head and recessed piston at TDC). Squish clearance is close (.013 inch); and at 8:1, effective com-



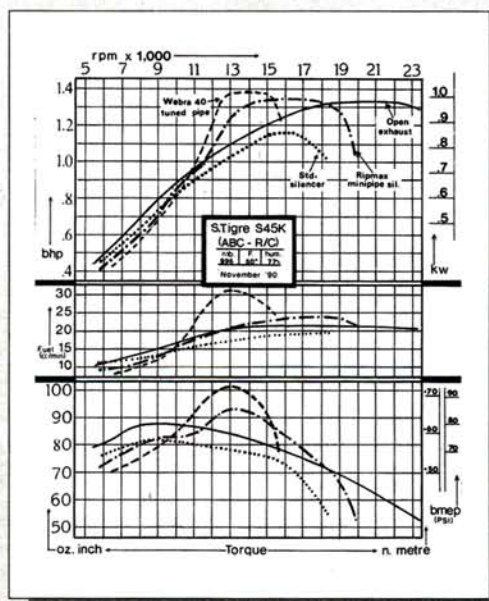
The cylinder head has a brass, glow-plug threaded insert.



Super Tigre's convenient, adjustable "swing" muffler offers a variety of mounting positions for a variety of aircraft.

pression ratio is high enough to allow the use of straight nitro or low-nitro fuel.

In keeping with the "Mag" carburetor bore of almost 9mm, the S45K's hardened-steel crankshaft has a generous 15mm shank and a 10mm bore. The secure bushed connecting rod and hollow wristpin with wire circlip complete the





simple parts list of today's typical single-cylinder model 2-stroke.

## POWER TESTS

To run-in this ABC engine, I use a variety of standard propellers. The measured rpm show a range that's as wide as you're likely to obtain with this engine.

**Test 1. Open exhaust.** Fuel: 5 percent nitro/5 percent ML70 synthetic oil/10 percent castor oil/80 percent methanol. Plug: Super Tigre long reach.

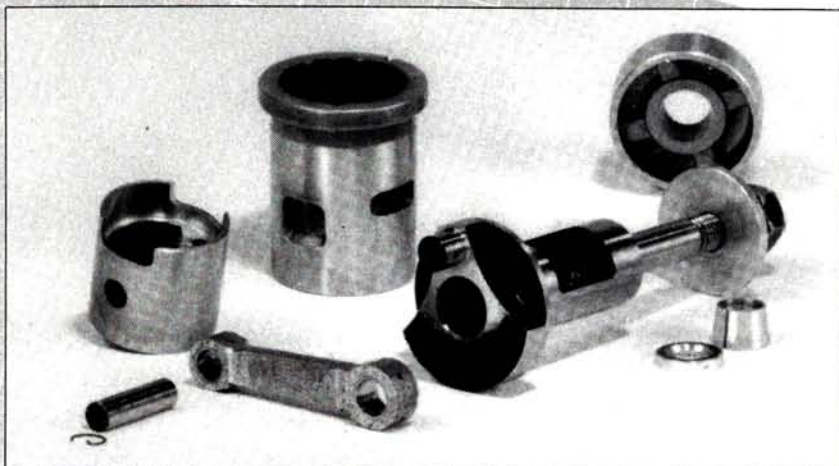
Maximum torque was noted at a fairly low 8,503rpm, and the variation in torque between 5,000rpm and 20,000rpm was only 25 percent. Clearly, the modern Schnuerle-ported engine still operates efficiently over a significantly wide speed range.

The nominal peak b.hp point was near 20,000rpm, but, as mentioned, this proved to be a very "flat" area, extending approximately from 17,700 to 22,000rpm. At higher rpm, the S45K continued its solid, vibration-free performance, even when approaching 24,000rpm.

**Test 2. Standard muffler.** Fuel and plug as in Test 1.

Super Tigre's convenient, rotatable "swing" muffler led to reductions in torque and horsepower that were in keeping with the reduced fuel consumption. With an outlet diameter of 7mm, this standard back-pressure muffler suppressed sound fairly effectively and also—as expected—restrained power as rpm rose (with a best hp of 1.17 being recorded at 15,352rpm).

**Test 3. Ripmax mini-pipe muffler.** Fuel and plug as in Test 1.



PHOTOS BY MIKE BILINGTON

This test gave me a chance to use the Ripmax equivalent of Super Tigre's Paw muffler. Unlike the latter, however, the length of this proprietary mini-pipe unit isn't adjustable. The internal length of the plain pipe is 10 inches (measured from the glow plug to the end of the pipe), and this gives a wide peak-resonance range that's great for users.

Stretching from 14,500rpm to 18,500rpm, this nominally "flat" peak works well with normal operational rpm when using a typical 10x6 propeller. The general trend is toward lowering rpm to reduce noise; the adjustable length of the Super Tigre Paw muffler allows the advantage of maximizing torque at lower rpm and allows the use of 11x6 or even 12x6 propellers.

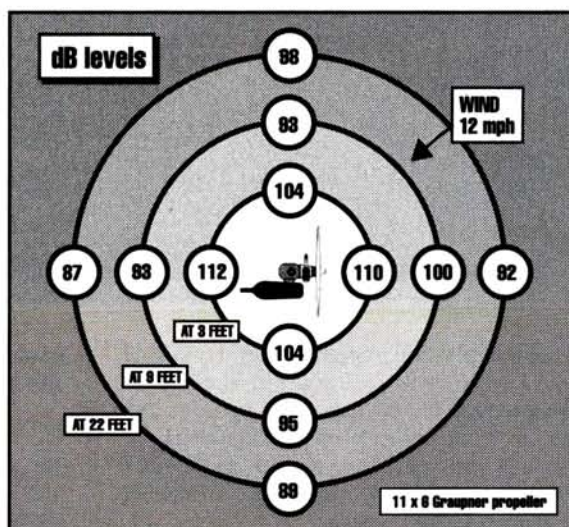
**Test 4. Webra 40 quiet tuned pipe.** Fuel and plug as in Test 1.

In pursuit of information, I set the length of this tuned pipe at 14 inches (glow plug to first maximum diameter),

*The chromed-brass liner has the usual twin side transfer and single boost (not that usual for Super Tigre, however). Note the very beefy crankshaft.*

## SOUND LEVELS—dB

Engine	Super Tigre S45K (ABC)
Equipment	Standard muffler
Fuel	5 percent nitro
Temperature	54° F.
Humidity	77 percent
Propeller	Graupner 11x6
Mean rpm	11,500
Engine position	3 feet above ground
Sound meter	Radio Shack's 33-2050 unit set 38 inches above the ground, pointing toward nearest sound, i.e., prop, muffler, or exhaust outlet, at distances of 3 feet, 9 feet and approximately 22 feet.

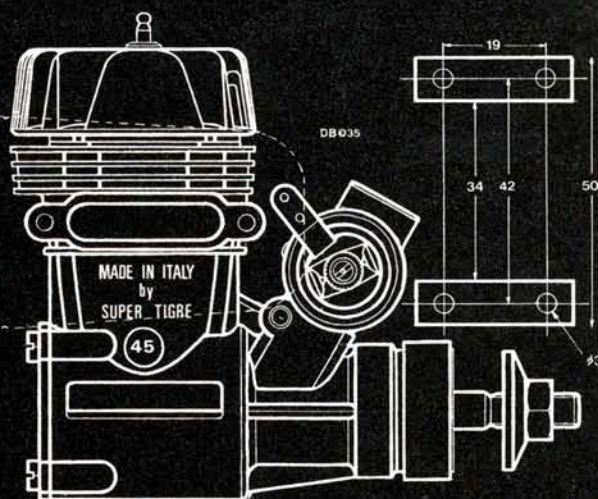




# SPECIFICATIONS

## WEIGHTS & DIMENSIONS

Capacity	0.45797ci (7.5048cc)
Bore	0.8505 in. (21.86mm)
Stroke	0.7875 in. (20.01mm)
Stroke/Bore ratio	0.915:1
Timing Periods	Exhaust - 154° Transfer - 124° Boost - 124° Front Induction: —Opens - 41° ABDC —Closes - 52° ATDC —Total period - 191° —Blow-down - 15°
Combustion volume	0.73cc
Compression ratios	Geometric - 11.28:1 Effective - 8.12:1
Exhaust-port height	0.242 inch (6.16mm)
Squish-band width	0.157 inch (4mm)
Cylinder-head squish	0.013 inch (.34mm)
Cylinder-head squish angle	4° (inner half)
Carburetor bore	0.353 inch (8.98mm)
Crankshaft diameter	0.5905 inch (15mm)
Crankshaft bore	0.393 inch (10mm)
Crankpin diameter	0.236 inch (6mm)
Crankshaft nose thread	0.250 inch x 28 TPI (1/4 UNF)
Wristpin diameter	0.197 inch (5.01mm)
Connecting-rod centers	34mm
Engine height	3.34 inches (84.90mm)
Width	1.98 inches (50.30 mm)
Length	3.04 inches (77.30mm)
Width between bearers	1.32 inches (33.50mm)
Mounting-hole dimensions	42x19x3.5mm
Exhaust-manifold bolt spacing	1.49 inches (38mm)
Frontal area	4.9 square inches
Weight	Bare - 11.55 ounces (328 grams) With muffler - 15.35 ounces (436 kilo)
Crankshaft weight:	1.95 ounces (55 grams)
Piston weight:	0.30 ounce (8 grams)
Performance:	
Max. b.hp	1.38 @ 13,646rpm (tuned pipe/5% nitro) 1.32 @ 20,025rpm (open exhaust/5% nitro) 1.17 @ 15,353rpm (standard muffler/5% nitro)
Max. torque:	105 ounce/inches @ 12,950rpm (tuned pipe) 87 ounce/inches @ 8,503rpm (open exhaust) 82 ounce/inches @ 8,223rpm (standard muffler)



68% OF FULL SIZE

## RPM on standard fixed-wing propellers:

	Open exhaust	ASP muffler	Ripmax M/pipe	Webra Muf. T/pipe
14x7 Graupner	6,929	6,630	6,605	6,517
13x6 MK Glass	9,080	8,757	9,288	9,427
12x6 Graupner	10,610	10,381	10,456	10,742
11x6 Graupner	12,066	11,705	12,859	12,600
10x6 MK Glass	13,370	12,918	14,245	14,357
10x4 Zinger	16,033	15,637	15,930	15,600
9x4 Zinger	18,849	17,494	18,277	17,845

## Performance Equivalents:

b.hp/ci	3.01
b.hp/cc	0.18
Ounce inch/ci	229.27
Ounce inch/cc	13.99
Ounce inch/pound	145.45
Gram meter/cc	9.99
b.hp/pound	1.91
b.hp/kilo	4.21
b.hp/square inch frontal area	0.28

**Manufacturer: Super Tigre SRL, Bologna, Italy.**  
**U.S. Distributor: Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.**

and this allowed the S45K to peak at the hoped-for lower rpm level of 13,646. As in Tests 1 to 3, this was really a median point; the actual "flat" peak extended from 12,800 to almost 15,000 rpm. The unusual prevalence of this flatness of horsepower maxima seems to be a feature of this engine's design. Average users might see it as a virtue, because very sharp rises to and descents from maximum horsepower are frequently an embarrassment.

If this particular pipe were used at a shorter length—12 inches—it would give a higher rpm peak (around 18,000rpm) and, probably,

greater horsepower and noise. The propeller required would probably be smaller (10x4).

## SUMMARY

The S45K's compact size and resultant high power-to-weight ratio makes it suitable for sport fliers, and its evident high quality and reliability show that Super Tigre continues its value-for-money philosophy. ■



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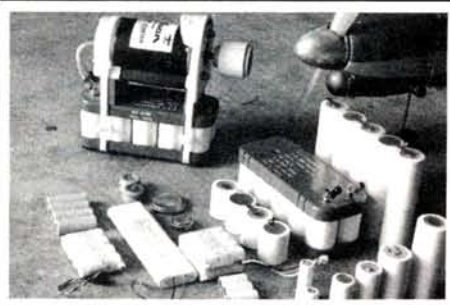
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## AIRWAVES

(Continued from page 53)

far as medicinal castor oil goes, it probably isn't as pure as the AA or AAA blends. Synthetic oil is more expensive than castor and doesn't inhibit engine rust as effectively. In fact, some synthetic residues attract moisture, and you have to use a good after-run oil to protect your engine properly. Klotz is one of the best brands of synthetic oil, and it's the choice of many competition modelers. Here's a good tip: if you use a synthetic-based fuel, add about 1 ounce of castor oil to every gallon, and play it safe. Also when you break-in an engine, it's good to use a fuel that has castor oil.

GY

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## "POPPING" TO PATTERN

I've recently got back into aircraft modeling and have built a really nice Sportster Biplane 40 from Great Planes. I've also acquired a 1960s experimental control-line stunter that's now being converted to R/C. If it flies, I'll send you pictures. If it crashes, my father (who gave it to me) will disown me.

I'm really into sport/pattern flying, but I lack knowledge when it comes to the stunts. In your helicopter section's column called "Helicopter Challenge," the author described and illustrated some maneuvers. We'd like to see an article geared toward planes. It should

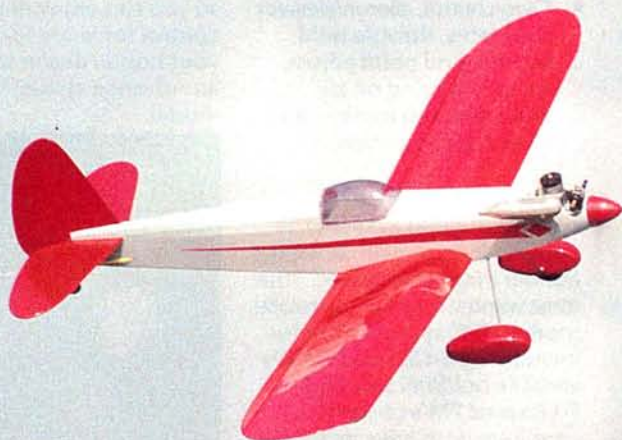
(Continued on page 86)



# HOBBY DYNAMICS SPORTEE

# 40

## A Capable Sport Flier Weighs In



**T**HE SPORTEE 40 heads Hobby Dynamics'\* new line of domestic kits. Shortly after its introduction, it was followed by several sport-scale warbirds that were based on it. [Editor's note: one of these kits is featured here as a "Reader's Report."]

The model falls into the very competitive, .40, sport-airplane market. With a 58-inch span, 536-square-inch area, a 4-pound weight and a thick, semisymmetrical airfoil, its flying characteristics are sporty, indeed. It's docile and forgiving at slow to moderate speeds and very aerobatic at the limit. Pilots with aileron flying experience should feel comfortable right away and have room to grow as they explore its potential.

Beneath the Sportee 40's surface lies a very simple structure, and its few parts are easy to assemble. Balsa is the primary building material, but there are some lite-ply fuselage formers, root ribs and wing tips. The fuselage has slab sides, a sheeted front, aft sections with stringers and a carved-block nose section. The wing uses hardwood spars, notched balsa trailing-edge stock and a dowel edge, with sheeting only at the center section. The tail surfaces are all of cut balsa sheet.

The kit's engineering, parts fit, plans and instructions are of average quality. The in-

structions are fairly complete and have good photos that roughly follow the building sequence. The plans are clear and have sufficient detail, but there are some differences between the plans and the cut parts. The instructions indicate that the plans are only a guide, and that the parts are cut to fit together properly.

Some wood in the review kit was poorly graded for its use. The ailerons, the trailing-edge stock, the fuselage sheeting, the stabilizer and the tail fairing blocks were of rock hard balsa (medium grade would have been better), and the balsa for the fuselage sides was of lighter density than was appropriate. (During construction, I replaced the top sheet and one fuselage side.) The die-cutting of the balsa ribs was excellent, but most of the lite-ply parts needed additional cutting with a modelers' knife or jigsaw to free them from

by RON FARKAS





the ply sheets.

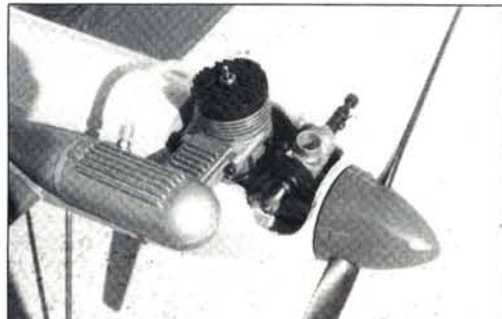
The kit included a clear, formed canopy, white plastic wheel-pant halves and bent  $\frac{3}{32}$ -inch-diameter landing-gear wire. The hardware consisted of aileron torque rods, landing-gear straps, a tail-wheel bracket, wheel collars, screws, clevises, horns and some strips of Mylar hinge material. Pushrods weren't included.

## CONSTRUCTION

All construction was performed using Carl Goldberg Models' Jet, Super Jet and Slow

Jet CA and Jet Set accelerator. The fuselage sides are only  $\frac{3}{32}$ -inch thick, but you install  $\frac{3}{16}$ -inch full-depth doublers from the nose back to the rear of the wing saddle. There isn't any more longitudinal reinforcement aft of this point. Next, glue four lite-ply formers and one hardwood motor-mount beam to one of the sides. Glue the second side in place to create the basic fuselage box. Add the remaining beam and one  $\frac{1}{4}$ -inch-square foredeck stringer. Bring the tail ends together with a piece of tapered balsa stock between them. Then add the stabilizer saddle, the turtle-deck formers and the  $\frac{1}{4}$ -inch-square balsa stringers.

Before you install the plywood bottom sheet and the balsa chin block, reinforce the nose section with triangle stock along the lower edges. At this point, I deviated from the instructions by installing the engine-bolt blind nuts and the top sheet while I still had access from below. You glue the top sheet from the inside, and it's easier to drip the Super Jet directly through



The engine fits snugly, but you have to provide clearance for the carburetor linkage.

## P-39 AIRACOBRA

The Hobby Dynamics P-39 Airacobra has a wingspan of 58 inches and a length of 44 inches. Its projected weight (as advertised) should be 3.5 to 4 pounds. The kit-supplied hardware is average, and the quality of the die-cutting is adequate. As for the wood, it's marginal. A Sportee 40 instruction manual and plans and a supplementary instruction sheet for the P-39 are also included.

I replaced many of the excessively dense pieces of wood. Still, further action was necessary to keep the weight at 4 pounds. I drilled lightening holes in the ailerons, the elevator, the stab and the rudder, and this required a lot of extra work. I covered the plane with Oracover\*. Using a Futaba FPT-5LK radio and old FPS-28 servos, the plane's final weight was 5 pounds. I installed the Magnum 45 Pro engine.

The plane flew perfectly right off the board! I didn't know what to expect, but I was surprised that its a high-performance screamer that also has docile slow-speed characteristics. Its full-power performance will allow nearly any maneuver. Landings are a breeze, as is dead-stick, power-off glide. The plane showed no tip-stalling characteristics.

Overall, the extra work to build this plane was worth the effort. Hobby Dynamics has a good design, but the company should supply better wood so that the advertised weight can be obtained.

This is definitely not a beginner's kit! I'd recommend it to intermediate and expert fliers who want an agile performer. Some additional building effort is required.

by SCOTT KELLER



## SPORTEE 40

the open bottom than blindly through the wing saddle and former F-2. The instructions left engine installation for last and never mentioned the blind nuts.

I used a 50-grit belt on an Art Gross Enterprises\* Wedge Lock hand-held sanding tool to roughly shape the nose contour. The tail surfaces only required the joining of the elevator halves and some sanding before being glued into place on the fuselage.

## SPECIFICATIONS

**Type:** Sport and fun-fly model

**Wingspan:** 58 inches

**Wing area:** 536 square inches

**Weight:** 3½ to 4 pounds (review model: 4 pounds, 10 ounces)

**Wing loading:** 20.8 ounces per square foot (review model)

**Length:** 41 inches

**Engine:** ASP .40

**Power req'd:** .25 to .45

**Prop:** Master Airscrew\* 10x6

**Airfoil:** Semisymmetrical

**Washout built in?:** no

**Wing construction:** built up

**Kit construction:** built up

**No. of channels req'd:** 4 (rudder, elevator, aileron, throttle)

**Sug. retail price:** \$72.99

**Features:** balsa and lite-ply construction; slab fuselage sides with turtle-deck stringers and sheeted nose section; simple wing construction with dowel leading edge and no leading-edge sheeting or capstrips.

### Hits:

- Pleasing, rounded contours that set it apart from the typical sport fliers you see today.
- For a sport airplane, it has good control authority and aerobatic capabilities.

### Misses:

- Some of the wood was too dense for its intended use.
- Some of the instructions appeared out of sequence or were too general, and this means extra work.
- Some of the lite-ply parts needed additional cutting with a modelers' knife or a jigsaw to free them from the wooden stock.

[Editor's note: Hobby Dynamics reports that it has taken note of the shortcomings mentioned in this article. The company has moved kit production to a new manufacturer and is in the process of upgrading the wood, the construction manuals and the blue prints.]



# SPORTEE 40

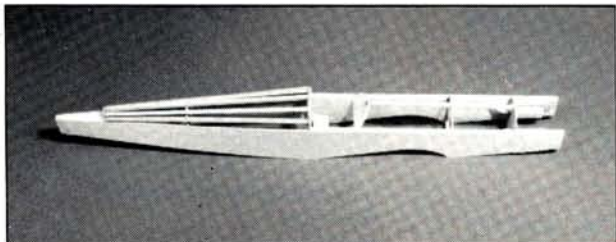
I installed the aft bottom sheeting after fitting Sullivan\* Gold-N-Rod pushrod sleeves with a cross-brace about midway to the tail.

The wing structure is refreshingly unique. Each root rib is made by laminating two pieces of die-cut 1/8-inch lite-ply, and then sawing out an aileron servo cavity. Basic wing construction consists of placing the ribs over the bottom spar, pressing them into the notched trailing-edge stock, and applying thin and medium CA to lock things together. As mentioned in the instructions, the notches are all cut accurately, but the left-wing drawing is about 1/2 inch longer than the one for the right wing.

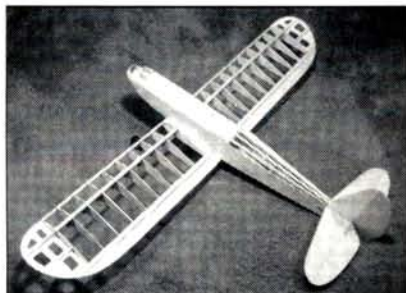
Next, install the top spar and the dowel leading edge. Glue the large, curved wing-tip part to the tip rib. (I positioned its angle with several tapered braces.) This makes it easy to achieve the elliptical shape.

Glue the wing panels together with the plywood dihedral brace. This produces a center rib that has four layers of ply and serves as the servo mount. Sheet the center section, and then install the torque rods and the fixed, center trailing edges. Install the vertical-grain shear webs. They come oversize in height and width, so you have to custom-fit each. Piece the last few in each panel together from leftovers.

Last on the agenda is the temporary fitting of the control surfaces. I didn't use the



The fuselage is a basic box with slab sides. Stringers provide the turtle-deck structure.

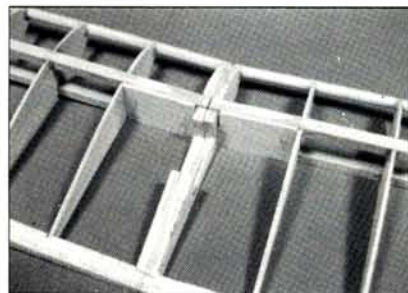


The simplicity of the structure is apparent. The wing panel has a simple, constant-chord structure with a lite-ply tip to give it an elliptical planform.

supplied Mylar strip-hinge material because it was too difficult to make hinge slots in the hard wood. Instead, I used SonicTronics\* new Nifty thin laminated hinges. They fit snugly into a slit (not slot) made by a hobby knife and, once they've been positioned, you can attach them permanently by applying a drop of thin CA. They feature a unique chordwise cutout that enables the CA to penetrate wooden surfaces better. Since you only have to trial-fit the hinges at this stage, the next steps are final sanding and covering.



The nose blocks and the triangle stock are shaped to meet the spinner ring and then hollowed out to fit the engine.



The panels are joined with a lite-ply dihedral brace before you sheet the center section. The root rib provides the servo-mounting surface.

## FLIGHT PERFORMANCE

*I certainly didn't expect any surprises from such a well-proportioned aircraft. I conducted the test flights from a wide-open grass field in moderate winds.*

- **TAKEOFF AND LANDING.** Smooth application of power yielded a short, straight takeoff roll, and only a touch of right rudder was needed. Slight back stick made the model gently break ground into a gradual climb. The first flight was completed with a smooth wheel landing and roll-out. Two more flights that day included photos and some basic aerobatics. This plane made a very positive first impression.
- **HIGH-SPEED PERFORMANCE.** With a hot .40, the vertical climb is unlimited. At top speed, the maneuvers can be stretched out for a graceful presentation but, at moderate speed, they can be packed together in fun-fly style. Straight-and-level cruise required only a little up-elevator and left-aileron trim. After the trim settings for the initial flight have been established, no further trim changes were necessary for different throttle settings.
- **LOW-SPEED PERFORMANCE.** At very low speed, the model can be forced to stall, but its nose just points straight ahead and drops a little. The same thing happens whether the plane is upright or inverted. While flying slow, close-in circuits for the cameraman, the model was extremely stable and forgiving, but it had very good control authority. As in high-speed flight, the airplane is very predictable.
- **AEROBATICS.** The model tracks well through inside and outside loops. Snaps and spins are easily initiated, and recovery is immediate when the sticks are returned to neutral. Rolls are nicely axial. I feel that the recommended control throws should be set at maximum for hot-dog flying and at about 75 percent for more conservative flights.

## COVERING

I covered the flying surfaces with Top Flite\* red MonoKote and the fuselage with gray Carl Goldberg Ultracote and a little red trim. After covering them, I installed the control surfaces permanently. I tinted the canopy, trimmed it by the cut-and-try method and glued it on. I had to trim the wheel-pant halves and glue them together with reinforcing strips along the interior of the seam. The proposed method of installation (simply trapping the in-board side between the wheel collars) was inadequate. By attaching a nose-gear steering arm to the inside, however, they're at least prevented from rotating.

(Continued on page 136)



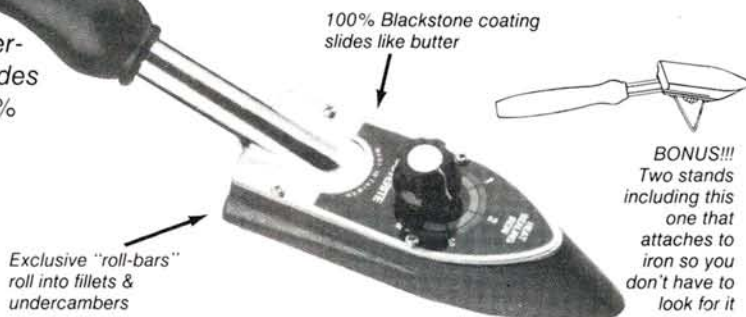
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## AIRWAVES

(Continued from page 78)

describe all the known stunts and tell how to execute them—show us exactly what an Immelmann should look like, etc.

My father says the most fun I had with model aircraft was when I was four and enjoyed the "pop" sound silkspan made as I

pushed my finger through it. Well Dad, if I knew then what I know now, I would never have "popped" your wings. A dream project I plan to start sometime soon is a 1/4-scale P-38 Lightning complete with bomb drop, machine-gun sounds, ejecting pilot and on-board video (so I can experience that fatal crash). The aircraft will require two transmitters—

one to fly it; the other for show time! Keep up the good work.

WAYNE S. WARD  
Earlville, NY

Wayne, I guess your father thinks the "popping" of his planes was a worthwhile price to

(Continued on page 90)

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# How To: RETRACTS

M A D E E A S Y

M I C H A E L S M I T H

## INSTALLING...

retractable landing gear in your model aircraft isn't as difficult as you might think. By "sucking up the gear," you not only add that touch of realism, but you also increase the model's performance by greatly reducing the drag inherent in the undercarriage. Looking at the different retract systems available, you can be overwhelmed by the variety of styles and prices. With prices as low as \$30 and as high as \$500, you're only limited by how much of an investment you're willing to make.



1. These are the components of a basic pneumatic tricycle-gear system: three retract units; air tank; servo-actuated control valve; several feet of 1/16-inch urethane hose; filler valve; and T-fittings.

I wanted to show you a system that can be applied to most of the models being flown today, so I've elected to illustrate the installation of a pneumatic (air-controlled) retract system. Pneumatic systems have been in use for more than 20 years. They're reliable and are generally easier to install than similar mechanical systems.

In my opinion, the B&D\* pneumatic system is the best value. Designed to accommodate models in the 6- to 12-pound range, this system is ideal for use in the F121-A that I'm building. Since nearly all pneumatic systems are similar in concept and design, the procedures and plumbing that I describe will apply to whichever system you choose.

## RETRACT INSTALLATION

Many people seem to get confused when installing the retracts in a foam wing. It's very simple, but exercise care when you remove unwanted material. Perform the procedures starting at photo no. 4 after the wing has been sheeted and before the wing halves have been joined.

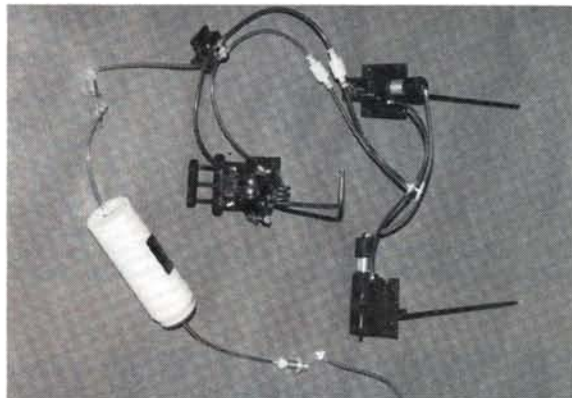
## NOSE GEAR

Nose-gear installation is straightforward and easy. Most nose-gear retracts allow you the options of vertical or horizontal mounting. If your aircraft is a conventional, propeller-driven model, the nose-gear assembly can be mounted on the rear of the firewall. Ducted fans don't offer this option, so I usually mount their nose gear horizontally.

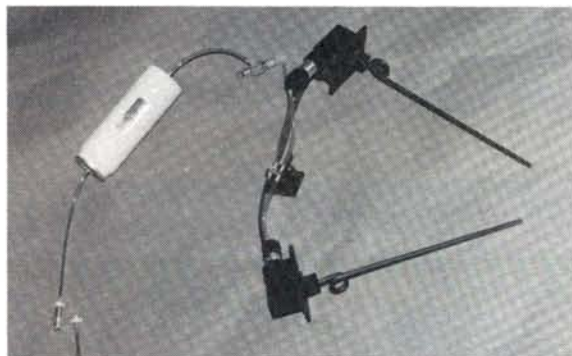
When you use pneumatic retract systems, you should also consider the speed at which the retract/extension cycles occur. We've all seen those pattern ships in which the gears slap up and down in less than 1 second. This isn't desirable because it puts undue strain on both the retract mechanism and the airframe itself. To slow the cycles, some method of air restriction

is needed. In-line air restricters are available from several manufacturers. Simply cut the air line and install these inside it. Many modelers use wheel collars to do the same thing. The air line from the tank passes through a 1/8-inch wheel collar, and the setscrew is turned in until the desired restriction is obtained. This system works very well, but it has one

(Continued on page 88)



2. Here are the routings and the proper connections for the air lines. The air line from the filler valve goes to the air tank, then from the tank to the control valve. The control valve is servo-actuated and switches the airflow from one side to the other. On one side of the air valve, a pair of lines is attached to the nose-wheel retract. On the other side of the air valve, a pair of air lines is connected to a pair of quick-disconnect couplers. The couplers enable you to disconnect the air lines from the mains so that the wing can be removed. From the couplers, the lines go to a pair of T-fittings that split the airflow and send it to each main.



3. If your aircraft has only retracting mains, do the routing in this manner: instead of using T-fittings, connect each side of the control valve directly to one of the mains. This system usually requires that the entire air system be installed in the wing with the servo wire being unplugged when the wing is removed (à la ailerons). Alternatively, you could use a quick-disconnect coupler between the tank and the control valve and leave the tank and filler valve in the fuselage.

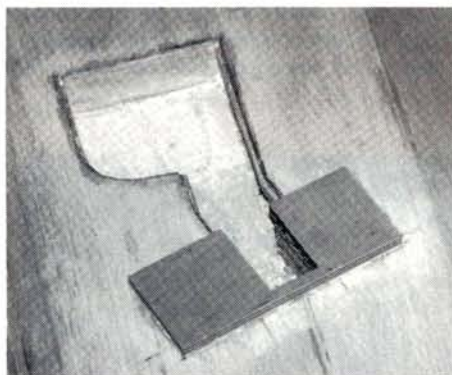


# RETRACTS MADE EASY

drawback: it's a little hard on the air line, and a leak will eventually develop where the setscrew pinches it.

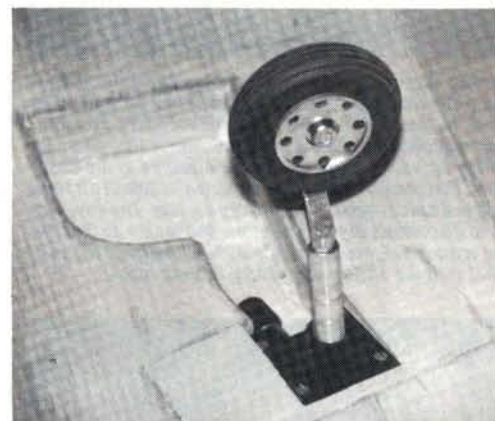
If you look closely at photos 2 and 3, you'll see a small device hooked up in line between the air tank and the control valve. It's a Peak Performance remote needle valve, and the pressure is regulated by turning the needle in or out, like on an engine needle valve.

I hope that those of you who were intimidated by the thought of retracts are now more informed and less hesitant. Go ahead; take that step toward realism!

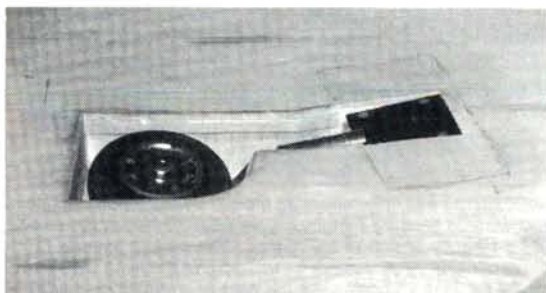


about  $\frac{1}{8}$  inch below the surface of the wing. Work carefully and slowly here. I usually use 80-grit sandpaper and just sand the foam away until I achieve the correct fit.

4. After you've marked the positions of the retract mechanism and the wheel well on the wing, carefully cut out and remove the wing skin from that area. (If you take your time and work carefully, you can use the wood that you remove to make gear doors.) Cut a one-piece mounting plate out of  $\frac{1}{4}$ - or  $\frac{3}{8}$ -inch plywood. The large plywood plate is necessary to spread the shock of landing over a wide area. Draw a line around the perimeter of the mounting plate, and remove the wing skin from this area, too. Now remove enough foam for the retract, the gear leg and the wheel to fit into the wing. Next, remove only enough foam from the mounting-plate area to allow the top surface of the plywood plate to fit

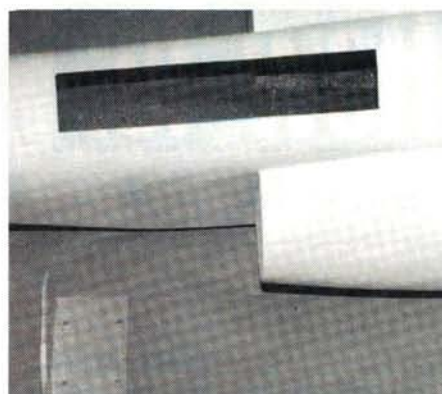


5. After you've test-fitted the retract assembly, epoxy the plywood plate to the foam. Use the epoxy liberally, and allow it to fill all the cavities. Scrape off any excess. After the epoxy has set, screw the retract mechanism to the plywood plate. At this point, the surface of the retract mechanism should be flush with the surface of the wing. Use scrap balsa to fill the area between the mounting plate and the surface of the wing. Use a sanding block to sand the scrap balsa flush with the wing skin. Line the wheel well with scrap balsa and sand it smooth. Run the air lines along the perimeter of the wheel well and through the foam to the center of the wing.

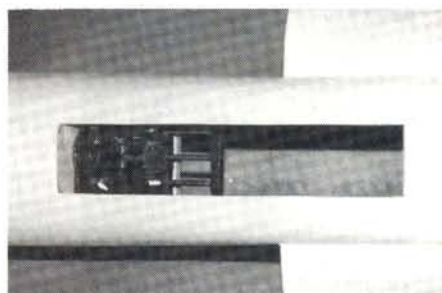


that's flush with the surface of the wing. At this point, I usually fill all the cracks, nicks, etc., with vinyl spackle and sand the surface with 220-grit sandpaper.

6. The installation is neat and strong. The top surface of the retract mount is flush with the wing skin and the entire assembly fits neatly into the wheel well when retracted. (In this case, I mounted the retract at a slight angle to achieve a scale appearance. After I've fitted all the gear doors, I'll cover the retract with a piece of scrap balsa to achieve a retracted position



7. After the gear doors have been removed, cut a plywood mounting plate to fit tightly between the sides of the fuselage. Cut another thin piece of plywood ( $\frac{1}{8}$  inch thick) to use as a vertical support between the mounting plate and the bottom of the fuselage. While you hold the mounting plate in place, place the retract on the plate and mark the mounting holes with a pencil. Remove the plate, drill the mounting holes, and install blind nuts on the back of the plate.



8. Place the mounting plate and retract assembly into the fuselage at the desired location. Glue it into place with CA. Check, double-check, then check again that the assembly is exactly where you want it. Carefully remove the retract and glass the mounting plate to the fuselage. Now, just install the control valve and servo assembly, the air tank and the filler valve.



9. Optional items, such as air tanks of different capacities, are available to enhance your basic system. Shown here are the Robart\* 10-ounce tank and the Peak Performance\* 16-ounce tank. Larger tanks usually have only one air fitting and so require the use of a T-fitting between the filler valve and the air control valve. The third leg of the T-fitting is attached to the air tank.

\*Here are the addresses of the companies mentioned in this article:

B & D Enterprises, Rte. 81, Box 7, Ballard, WV 24918.  
Robart Manufacturing, P.O. Box 1247, 310 North 5th St., St. Charles, IL 60174.

Peak Performance, 1362 E. Edinger, Bldg. B, Santa Ana, CA 92705.



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## AIRWAVES

(Continued from page 86)

pay for your strong interest in R/C aeromodeling, although he might not have felt that way when it was happening! As to well-illustrated articles on aerobatic maneuvers, we'll offer such coverage in future issues. We'll also run a new column on aerobatics by David Patrick—the noted pattern competitor and model designer at Carl Goldberg Models. Look for the first installment in our March issue! I bet our readers would like to see your Lightning "dream project," so keep us informed of your progress! TA

**WRITE TO US!** We welcome your comments and suggestions. Letters should be addressed to "Airwaves," *Model Airplane News*, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

## FUN-ONE

(Continued from page 52)

### THE WING

The wing is basically a standard D-tube assembly that's heavily reinforced for high-stress maneuvering. The wing ribs are die-cut with the forward portions removed for light-

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## FUN-ONE

(Continued from page 90)

ness. The spars are made out of double balsa, top and bottom. The ribs and spars can be assembled in about an hour. Shear webbing, which is used generously, is reinforced by a large plywood joiner. The center section is quite beefy because of the hold-down plates installed in the leading edge for wing-to-fuselage attachment.

You can build the wing with a single aileron servo or with twin aileron servos in the outboard wing panels. I decided to use the twin aileron setup because it provides flaperon capability and makes the aileron response quicker. For this option, I built servo boxes into the wing's outboard portions, and I installed paper tubes that ran from the boxes to the wing center section.

Apply the wing sheeting to the top and bottom of the wing's forward portion. (The trailing edge receives none.) The ailerons require sanding to match the thickness of the wing trailing edge.

The complete hardware package includes a 19-size engine mount, which was too small for my engine. I replaced it with a bigger mount that fits my ASP\* .32 ABC. These powerful, reliable engines feature Schnuerle porting for power and speed; a new, two-needle, large in-

(Continued on page 118)




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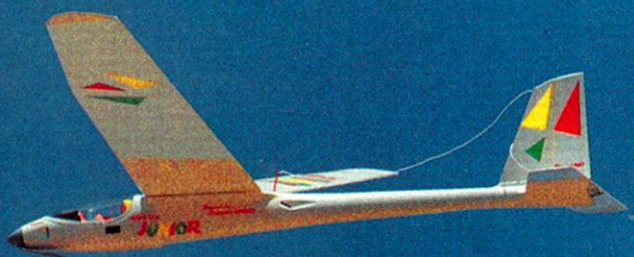
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by John Fredriksen

**T**his 300-page, comprehensive reference book documents model airplane kits from the hobby's early days to the present. Included, you'll find data on more than 600 types of historical aircraft and the products of more than 400 manufacturers from 15 different countries. Listed in this manual are plans, kits and semi-kits. You'll find information on what is available worldwide, where to find it, and what you might expect to pay for it. Each entry includes data on wingspan, length, motor, flight mode, and availability of cowl, canopies and retracts. Also included are appendixes on documentation, model magazines worldwide and international organizations.







## High-Performance ARF Electric Glider

HOBBY LOBBY

# Elektro Junior



**D**ISTRIBUTED BY Hobby Lobby\*, the Graupner Elektro Junior is an evolution of their well-known UHU and Chip electric models. The Junior is larger than its predecessors and therefore better suited to being a trainer. Its increased span and wing area allow it to fly more slowly, and this gives novice pilots more time to react. Owing to its larger size and weight, it's recommended that it be flown on seven cells, although it will perform quite nicely on six.

Like the UHU, the Junior matches up well to several of Graupner's electric drive systems. I use the system referred to as "sport," in Hobby Lobby's catalogue. This direct-drive system includes an 8.4V Speed 600 motor, an 8x4.5 Scimitar folding prop, hook-up wire, connectors, and capacitors to reduce radio "noise" interference from the motor. This system is suitable for the Sunday fun flier and is quite adequate.

by JOHN LUPPERRGER



## CONSTRUCTION

The term "construction" is probably a bit misleading, as this is one of the more "ARF" ARFs you're likely to put together.

The only part of the Junior that actually requires some construction work is the fuselage, which is a one-piece "rotationally" molded unit that has the properties of heavy ABS plastic. It's quite strong, but slightly heavier than an equivalent built-up fuselage would be. First, the plywood firewall is drilled for the motor-mounting screws and then tack-glued to the motor. It's then installed in the fuselage with glue on its front where it will contact the flat front inside the fuselage. The prop and spinner are then attached to the motor shaft and used to align the motor as the glue sets. After the glue has dried, the motor is removed, to be re-installed later.

The plywood tray for the batteries and servos is then slid in through the canopy opening and positioned in the area under the wing. Once positioned, the tray is glued to the fuselage sides.

Next, the plywood wing fixing web and hardwood reinforcement pieces are assembled to make one unit. The web is then glued to the underside of the cross-brace in the fuselage wing-saddle opening. This will later be drilled to accept the wing hold-down blind nuts.

The canopy and cockpit tray are then prepared for mounting on the fuselage. Two small plywood blocks and screw hooks are supplied so that the unit can be attached with a rubber band (one hook goes in the bottom of the fuselage; the other, on the bottom of the tray).

I painted the pilot figure with "flat" model paints and gave him a "Prussian" look (after all, it is a German kit) by painting his hair and moustache blond. The cockpit and pilot figure give the model a nice finished look. The NACA-style scoops in the front of the fuselage and just behind the wing are cut out for the air inlets and exits.

The vertical and horizontal tail surfaces are both made of sheet balsa. They come completely finished, covered and hinged with tape. Just mount the control horns and mount them to the fuselage. This requires that you remove the covering where the tail surfaces slide into pre-formed slots in the fuselage and then glue them into place. The rudder and elevator are then hooked up to the pushrods with clevises. The pushrods are made up of a

## FLIGHT PERFORMANCE

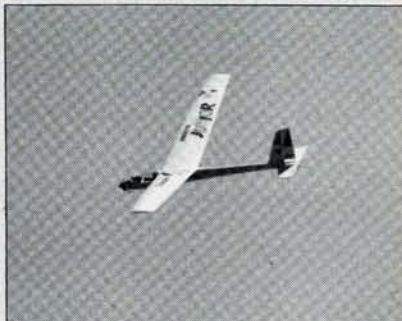
*Usually, when I test-fly a new model, I'm nervous, but for some reason, when the time came for the Junior's first flight, I was quite calm. Although it seemed to be a little heavy at 53 ounces, I was sure everything would go well.*

### • Takeoff and landing

The first flight was performed using a 7-cell 1200mAh battery pack. I advanced the throttle, the Speed 600 came to life and the Junior was off! Having flown electrics for several years, I've learned to keep direct-drive models on "step" and to allow the wing to get the model up, not the prop. I was quite surprised at the high air speed the Junior reached when on step. The model covered a lot of ground very quickly and, after 40 to 45 seconds, it was above normal launch height for a winch-launched glider. It was early in the morning, and the thermals hadn't yet started, so I cruised around the field for a few minutes until I was down to about 50 feet of altitude. I pushed the throttle forward and climbed out again. After cruising around until I was almost on the deck a second time, I hit the throttle again. I was able to reach launch height one more time, although at a slightly slower pace.

As is usual when I test a .05-type aircraft, I always try battery packs of a variety of sizes. The next flight was made with a 6-cell, 1200mAh matched Sanyo pack. With this pack, the climb rate was reduced, but there was extra run time.

The airplane requires only a mild launch—not a javelin throw. It makes a shallow climb and moves out fairly quickly for an electric glider of this size running on a Graupner Speed 600 motor. When landing the plane, you can hold it nose-high without fear of it dropping a wing tip. On a rough field, the low stabilizer is susceptible to being damaged (the leading edge of the stab on mine has a few dings).



### • High-speed performance

At full power, the plane tends to climb, so down-trim is needed to keep it at the same altitude. When you make the transition from full throttle on six cells to pure gliding flight, the Junior settles into a glide without needing trim change. On seven cells, more down-trim is required during full-throttle flight, and then up-trim must be added for power-off gliding. Pylon turns aren't fast, of course, but there are no problems in carrying through the turn.

One thing that became evident very quickly is the Junior's excellent LD. It covers ground quite quickly, but it doesn't lose very much altitude because of its efficient, fully sheeted, Eppler 193 airfoil wing and overall clean design. Its excellent LD allows you to cover a lot of territory as you look for lift, and it can get quickly out of areas of sink. When there's lift available, I've experienced flights of about 20 to 30 minutes on one charge.

### • Low-speed performance

When the thermals started to break, I had the opportunity to check out the model's thermalling ability. Because it's a straight dihedral model (no poly joints), it turns a little differently. It takes a bit more "up" in a tight turn than a poly ship and really prefers wider turns. This doesn't detract from its flying ability; it just requires a little adjustment in technique. To stop a turn, you must also apply opposite rudder rather than just releasing the stick.

The plane can fly very slowly, and there's no tendency to tip-stall. As a European-designed glider, the Elektro Junior has a somewhat higher wing loading than similar planes designed in the U.S. Still, you get the kind of duration performance that's possible with a lighter plane, because its design, aerodynamically, is very clean.

### • Aerobatics

Although not designed for aerobatics, the Junior will do loops and slow barrel rolls. To do a barrel roll, I dive to gain speed then pull up and slam the rudder. Apply full down-elevator at the top, and then get off it; it will pull around because of its high dihedral. Overall, the plane is easy to handle and has crisp turning characteristics. Loops require minimal roll input, but a lot of elevator. Inverted flight requires full elevator. The Junior can be flown inverted and level under power.

Though it's a larger plane, given its power system of only six or seven cells, it has no problem in outperforming most planes of a similar size on the field. It can handle wind better than the typical open-structure polyhedral airplane. With a cobalt motor, the plane could be competitive in a short-motor-run, fun-fly powered-glider contest. Because it has no spoilers or flaps, however, spot landings wouldn't be easy.



## SPECIFICATIONS

**Type:** Electric sailplane  
**Wingspan:** 83 inches  
**Weight RTF:** 49 ounces (review model: 53 ounces)  
**Length:** 40 inches  
**Wing area:** 521 square inches  
**Wing loading:** 13.5 ounces/square foot (review model: 14.6 ounces/square foot)  
**Motor used:** Graupner Speed 600 direct drive  
**Motors recommended:** Speed 600 up to Ultra 800 cobalt  
**Propeller:** 8x4.5 Graupner Scimitar folding prop  
**No. of channels req'd:** 3 (rudder, elevator, motor-on/off)  
**Radio:** Cirrus FM 7-channel w/2 mini servos, 250mAh battery, and Panda PSC-1 electronic speed controller  
**Airfoil type:** Eppler 193 (semisymmetrical)  
**Washout built-in?** Yes  
**Wing construction:** Built-up (ARF); fully sheeted  
**Sug. retail price:** \$179

**Features:** The kit is an ARF electric glider—stab, fin/rudder, and fully sheeted wing are of built-up construction, and are factory covered. The one-piece molded fuselage is similar to heavy ABS plastic. Pushrods, wing hold-down blind nuts, hinges and other hardware come with the kit. The Speed 600 drive system was purchased separately.

**Hits:**

- Handles wind better than typical open structure polyhedral electric glider airplane.
- Fully sheeted Eppler 193 airfoil provides excellent lift/drag ratio, which allows you to cover a lot of ground as you look for lift or avoid sink.

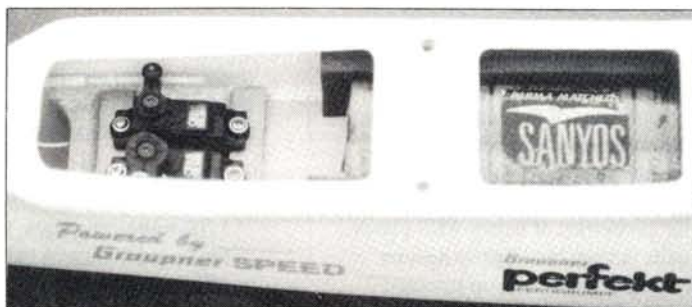
**Misses:**

- Low stab can be damaged when landing in the rough.

small plastic "cable" that's run through an outer plastic sheath known as "Bowden cable." The outer sheath is glued to the inside of the fuselage to prevent bowing during flight loads.

The pre-built foam-core wings are covered and ready to go. Just cut holes in the covering for the wing rod, and drill the holes for the wing bolts. The wings

*The cross-brace in the wing saddle has the fixing web glued to its underside. The wing is bolted down at this point. The radio gear and batteries fit without problem.*



are then put together on the pre-bent wing rod and positioned on the fuselage. The bolt holes are then used as guides to drill the wing fixing web for the hold-down blind nuts. These are mounted in the holes, and the wing is bolted on to



*Tail surfaces fit into slots in the rear of this fuselage, so there's no need to guess about positions or alignment.*

draw them up into place. A few drops of Zap\* secures them to the web. The last step is to apply the "shredder"-style graphics that are becoming so popular.

## INSTALLATION OF RADIO AND ELECTRIC GEAR

The rudder and elevator servos are mounted in the rear of the servo tray (at the back of the wing-saddle area). The receiver is mounted with Velcro® under the servo tray, about in the middle of the wing opening, and the Panda speed controller is just in front of it. The 250mAh airborne battery is also mounted with Velcro® in the canopy area, just behind the motor.

The flight battery pack slides into place on the servo

battery tray through the canopy opening. It's held securely by strips of sticky-back foam rubber that's applied to the fuselage sides (friction fit).

When everything had been mounted, the Junior's ready-to-fly weight was 53 ounces—4 ounces over the manufacturer's recommended weight. This difference is probably the result of my using an airborne radio Ni-Cd and an electronic speed controller. If a voltage-regulated BEC on/off switch were used, the weight could be reduced by 2 to 3 ounces.

Before flying, the motor was broken-in by being run at low voltage on a Tekin\* motor break-in unit for about an hour-and-a-half. After break-in, the motor was mounted in the fuselage and the Scimitar folding prop and spinner were mounted. A quick check showed that the model balanced perfectly without the need for ballast or to rearrange components.

## CONCLUSION

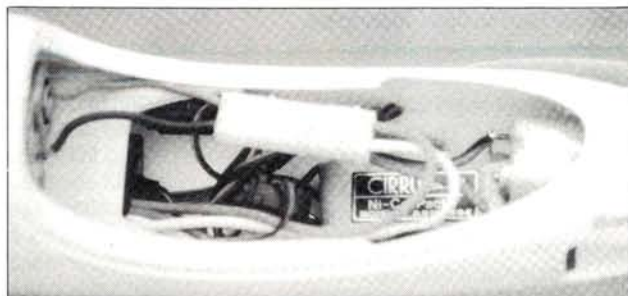
The Junior's performance equals or is better than one you'll get from a model you've built yourself. I've let many people fly the Junior, and the consensus is that, "This is one fine flying electric sailplane."

*\*Here are the addresses of the companies mentioned in this article:*

**Hobby Lobby International**, 5614 Franklin Pike Cr., Brentwood, TN 37027.

**Zap**; distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414.

**Tekin Electronics**, 970 Calle Negocio, San Clemente, CA 92672.



*The area under the canopy doesn't have much in it except the 250mAh airborne Ni-Cd and wires.*



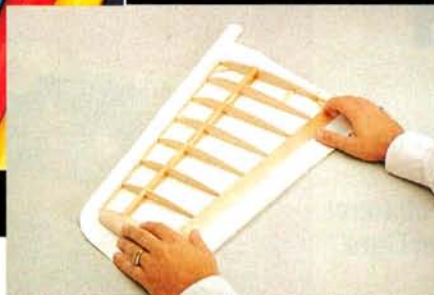






These are some of the many colors available for 21st Century Space Age Film and Fabric.

# USING COVERITE'S NEW. 21ST CENTURY



(1) Jeff first cut a piece of film that had 1 to 2 inches of border around the wing panel perimeter.



(2) "If you simply start at one side and work toward the other, iron-ons can 'gather,' so, instead, you divide by halves. Visually halve the material between the tack points; pull it and iron it down."



The wheel pant on the left was painted minutes before this photo was taken, shortly after it had stopped raining.

## NEW PRODUCTS FOR FINISHING AND DETAILING YOUR MODEL

BY THE STAFF OF  
MODEL AIRPLANE  
NEWS

PHOTOS BY YAMIL SUED

JOSH KRAEMER of Coverite and Jeff Troy, noted scale modeler and author (his works include *The Sport Flier's Guide to Finishing and Detailing Model Airplanes*, Motorbooks International, 1989), recently visited our offices to give us a demonstration of the new 21st Century Space Age Paint™, Space Age Film™ and Space Age Fabric™ product lines. Here's our report on what we saw.

### USING 21ST CENTURY PAINT

Jeff began by spraying an ABS plastic wheel pant with blue 21st Century Space Age Paint. Jeff noted that one of the nice things about 21st Century Paint is that it doesn't react badly to humidity or condensation. Jeff put a mist coat on the pant, let it stand for 30 seconds and then applied a wet coat. Surprisingly, we saw no droplets of paint running down the pant (as many modelers have experienced, this is all too often a problem).

Fifteen minutes later, inside our studio, the paint was sufficiently dry for the pant to be handled without marring the finish. Jeff noted that though lacquers may dry a little faster, they tend to blush much more when you paint in high humidity. Like Coverite's Black Baron

Paint, 21st Century Space Age Paint is tough. Jeff smashed a pre-painted pant against a stone mantel, and where ABS plastic was newly visible, there was no peeling or flaking.

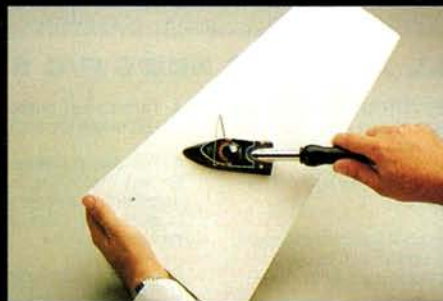
### USING 21ST CENTURY FILM

We asked Jeff what's the primary benefit of the new film. Although it takes slightly longer to shrink 21st Century, compared with a widely used brand, "It isn't nearly as sensitive to the elements. For example, wrinkling along trailing- or leading-edge sheeting; most of the other materials tend to start rippling as time goes by. With 21st Century, it stays put. This is the result of what we refer to as 'shrink control'." 21st Century film also feels slightly softer—not quite as "krinkly" as some other commonly used brands.

"Because it reacts more slowly to heat, it means the job is going to stay there. It's not going to react in the next six months to every 5-degree change in temperature the material sees." Jeff showed us a wing panel that had been covered with 21st Century Film six months previously and had spent several weeks in the back of his hatchback. We saw no rippling.



(6) After sealing the perimeter, Jeff shrinks the material in the middle with a heat gun.



(7) "Here, I'm covering the spar. I'm applying pressure to the forward end of the iron. I'll gradually increase the pressure until I've got the material flat. Then I'll do each rib. The best way to do this, in truth, is with a heat gun and a damp towel or rag. The damp rag cools the material a little faster."



(8) Jeff noted that there's no problem applying 21st Century Space Age Fabric right over 21st Century Fabric. He created the scalloped pattern on poster board, transferred it to red fabric and applied this directly over the yellow fabric. "At 225 degrees, I lightly iron down about 1/4 inch of the perimeter."



# RY PRODUCTS



(3) "Next, I divide the half in half; and then those halves are divided in half—constantly pulling the material and tacking. You pull just enough to make it tight."



(4) "After the perimeter has been ironed out, you can use any edge on the wing surface as a guide for your no. 11 X-Acto blade. You just draw across the edge. At the wing tip, use the same technique."

The Airtronics Olympic 650 wing panel used in the demo had been rough-sanded, starting with 100-grit sandpaper and graduating to 320-grit paper. Jeff advised: "Before you cover, vacuum thoroughly, and use tack cloth to wipe the balsa clean. One piece of dust under a covering job is like a cactus in the desert."

21st Century film is applied at 250 degrees, but it requires 325 degrees to shrink and seal. "Be sure to use a thermometer (Coverite offers one) when covering; you never know where you are without one. The trick to a good covering job is not how well you can shrink it afterward, but how well you can put it on. Like changing a wheel where you tighten lug nuts in opposite corners, I'm constantly pulling the material tight, ahead of the iron, then tacking at opposite ends of the panel."

Jeff commented that the covering job isn't done until you've tacked, sealed the perimeter, used a heat gun to shrink the film in the middle, and completely ironed all surfaces. We found this interesting because not all covering experts recommend that you seal a film covering to all wooden surfaces. Some recommend that you seal the perimeter with an

iron and just use a heat gun thereafter. We asked about the technique. "When ironing the film down onto the wood surfaces, you don't necessarily need to use a mitt to avoid making indentations on the balsa; you just need to be careful with the iron." Jeff then noted the best approach is to use a heat gun and damp cloth to seal the wood in this phase.

## USING 21ST CENTURY FABRIC

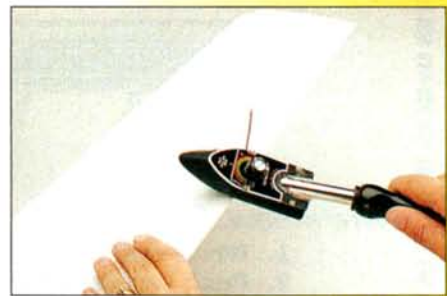
21st Century Fabric is a fuelproof, painted fabric that's applied at 225 degrees; 250 degrees is used to seal and shrink the edges. "It offers the equivalent of a hand-rubbed lacquer finish, although not a super high gloss. A lot of models take on a different, more authentic, 'golden-era' look when you use fabric. Fabric is also tremendously strong."

Jeff advised that you don't have to worry too much about trim materials. "This piece of red is ironed directly over the yellow. Working with a film covering, you'd have to avoid sealing film over film because of potential bubbling."

As the demo proceeded, the air created by the heat of the iron would invisibly bleed to



Jeff Troy with his Sportster, which he built and covered with 21st Century Fabric for the Toledo show.

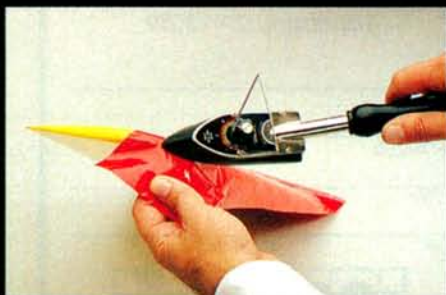


(5) "To seal down the perimeter, use a 325-degree iron. Don't iron from the root to the tip. Instead, iron around the corner edge of the panel: from the bottom of the wing toward the top of the wing."

the side, underneath the red fabric. "There's a limit; you do have to be careful not to trap excessive air. But the air goes through the underside of the fabric. It can bubble, of course, but you can almost always iron it away."

Although we haven't yet tested these products ourselves, we were impressed by what we saw. The manufacturer claims that the film is resistant to rippling, and we saw how easy it is to use the new paint. Gone are your headaches of masking and painting cloth trim. This 21st Century line appears to continue the development of Coverite's high-quality line of durable finishes and coverings.

\*For more information, contact Coverite, 420 Babylon Rd., Horsham, PA 19044; (215) 672-6720.



(9) The iron can be used to heat the material so that it becomes pliable enough to pull around corners.



(10) The fabric is sealed with a 250-degree iron. Small air bubbles dissipate through the weave of the fabric, so eliminating the need to vent with pinholes.



(11) "It's simple ironing fabric over fabric. Can you imagine doing that with a film?"



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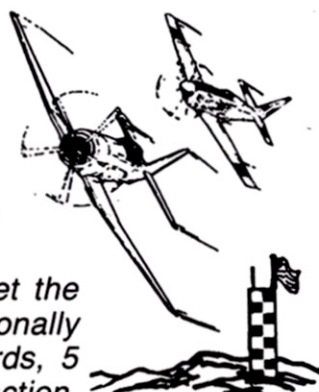
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## FUN-ONE

(Continued from page 91)

take carb; a ball-bearing main shaft support; and an expansion chamber muffler.

I chose the Focus 6 FM radio from Hitec/RCD\*. This full-feature 6-channel radio features end-point adjustment on the primary four channels, servo-reversing on all channels and trainer cord options, and it's fully 1991 compatible. (See the sidebar for more information.)

The finishing touches include a tempered-aluminum Dural-type landing gear. The Fun-One must have been designed with rough fields in mind, as it has a lot of ground clearance. In fact, the bird looked a little funny with the small tires that I was using for a paved runway. Rest assured that this aircraft can handle any runway.

The aircraft's balance point is measured from the wing's trailing edge, which is 7<sup>3</sup>/<sub>8</sub> inches from the rear. My model's balance point came out 1<sup>1</sup>/<sub>8</sub> inch forward of the recommended position, which was within the design's limits. I thought the all-up final weight of 4.25 pounds might be a little heavy for only 558 square inches. Time to find out.

## AT THE FLYING FIELD

At the field, I mounted an APC\* 9x6 prop to the ASP .32 ABC and proceeded to fire it up. On 5-percent-nitro fuel, I had to tweak it just a hair on the low-speed needle valve to attain a solid 2,900rpm idle. The ASP tops out at 13,000rpm, and this was on the first run out of the box. It looked very promising. After the final checks, I taxied onto the runway.

The wind was blowing lightly at about 8 to 10mph, and when the throttle hit full power, the Fun-One was off the deck in about 25 feet. Two clicks of left aileron trim, and I could fly hands off. After touching the ailerons, I understood why this isn't a beginner's plane. The ailerons occupy a little more than 15 percent of the total wing area, which is a lot. This means that they're sensitive! The Focus 6 radio doesn't have dual rates, so I had to get used to fast roll rates.

(Continued on page 136)

## ★ SUKHOI SU-26m

\$52.99



Wing span ..... 54 inches  
Engine ..... 35-45  
Weight ..... 4.5-5 lbs.  
Radio ..... 4 Channel

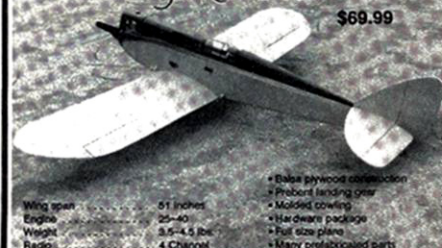
Budget Kit

- Foam wing cores
- Butylate canopy
- Plastic covering & louver
- Hardware package
- Full size plans
- Aluminum landing gear
- Machine-cut plywood parts
- Printed parts templates

Budget kit does not include Balsa wood

## DeHavilland DH-71 TIGERMOTH

\$69.99



Wing span ..... 51 inches  
Engine ..... 35-45  
Weight ..... 4.5-5 lbs.  
Radio ..... 4 Channel

- Balsa plywood construction
- Probert landing gear
- Molded covering
- Wire wheel packages
- Full size plans
- Many prefabricated parts

## WildTHING

\$39.95



Wing span ..... 36 inches  
Engine ..... 10-15  
Weight ..... 35 oz.  
Radio ..... 3 Channel

- Quick, easy-to-build
- Accommodates full-size servos
- Compact, easy to transport
- All machine-cut parts

- Complete hardware package - fuel tank, engine mount, fuel line, hinges and pushrods

## WildTHING .40

\$64.95



Wing span ..... 48 inches  
Engine ..... 35-45  
Weight ..... 4.5 lbs.  
Radio ..... 4 Channel

- Quick, easy-to-build
- Compact, easy to transport
- All machine-cut parts

- Complete hardware package - engine mount, pushrods, control horns, landing gear and hinges

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**Dornier Zep. D.III**  
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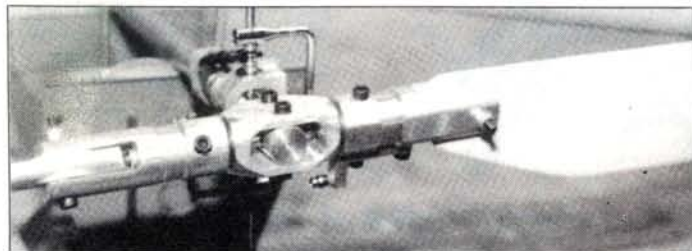
# MINI-ELITE ROTOR HEAD

by A.E. STANLEY

## A new upgrade for tighter tracking

**A**BOUT A YEAR AGO, Gorham Model Products (GMP) closed their doors. Fortunately, Bill Curtis of Tech Specialties\* picked up most of the GMP line and is providing parts support for the Cobra, the Competitor and the Legend. One other item that made it to Bill was the Mini-Elite rotor head. This head is available for the Shuttle, the Enforcer and the Concept 30. (I had to have one for my Concept.)

Included with the head is a set of ball links and rods that you use to complete the linkages. The piece also comes with a full-color picture to show you what the head will look like when it's installed on the helicopter. My rotor head didn't have a

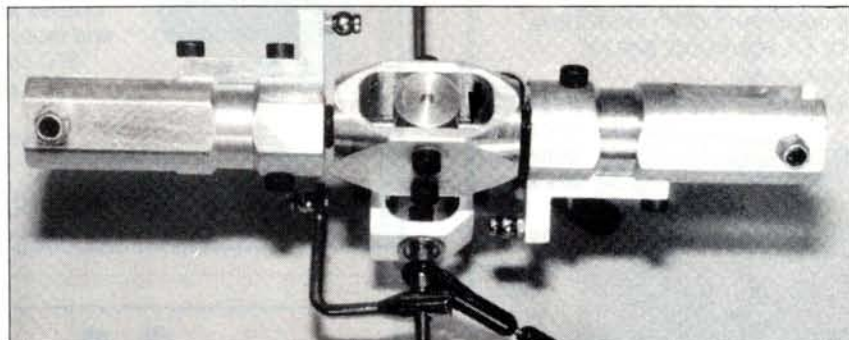


*When put on the High Point, the head was dead-on. This photo shows it with blades during the final balancing. True balance is paramount to the performance of any head.*

flybar, but I've been told the current units are coming through with flybars.

### ASSEMBLY

The assembly of this head takes little time because it's completely assembled except for the flybar and the linkages. To install the flybar, you must first remove the "stub bar" that holds all the linkage pieces in place for shipping. Take care to lay out all the parts in the order that you remove them. The full-size flybar slides right back in place of the stub bar. Before you tighten the flybar levers, make sure that the flybar



*The major advantage of the Mini-Elite head over the stock head is its one-piece feathering shaft. The arrow shows the shaft passing through the center of the head.*

is centered and the levers are perfectly straight.

Check the linkages on your machine before you remove the old head. If you turn on your radio and set the throttle/pitch to hover, you'll be able to see the basic alignment of the pitch levers.

(I took a Polaroid shot of the original head and matched the pitch-lever alignment to it when installing the new head.) Check your hovering

pitch, too, because it's directly related to the alignment of the mixing levers. Assemble the linkages, and install them on your machine. At this point, check the entire pitch range.

### FLYING

I flew the Concept with the stock head just before testing the new one. In its stock form, the Concept has a tendency to pitch "nose-up" during forward flight. If you fly a Concept, then you're probably familiar with the tracking problems and the flight characteristics that come with this type of problem.

With the Mini-Elite head, the tracking was dead-on the first time I put it into a hover. The hover was rock stable and predictable in its movements, and the

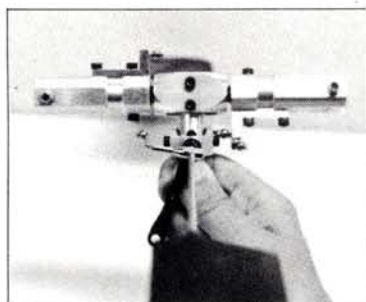
ITEM	STOCK CONCEPT 30	MINI ELITE
Flybar	In-line	Underslung
Center of head to blade bolt	85mm	68mm
Center of blade grip to ball link	DX & SE—25mm	20mm
	SX—20mm	
Material	Primarily plastic	Aluminum
Damping Mechanism	Separate, feathering spindles with shaft with four O-rings	Single, feathering rubber dampers



machine had a "tighter" feel. All the forward-flight maneuvers seemed to have a smoother feel, and the tracking was straight and true throughout the entire flight envelope.

### SUMMARY

By simply bolting this rotor head to your machine, you'll change the way the heli handles. I put the head on the High Point\* balancer before putting it on my helicopter, and it balanced perfectly. This head is a fine piece of work. Bill Curtis is a very good de-



Aside from the flybar and the paddles, this is how the head comes out of the bag. You'll be at the field in no time.

signer of helicopter parts, and his talents show through on his updated design of the Mini-Elite head. The retail price of \$179.95 for the Concept model is very fair for a product of this nature.

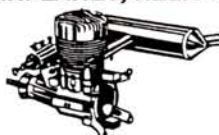
I recommend this head to any flier who owns a Concept and wishes to improve its flight envelope. It's a good product for the money and will do anything you ask of it—except regularly go out of track. Happy flying!

\*Here are the addresses of the companies mentioned in this article:  
Tech Specialties, 218 Vernon Rd., Greenville, PA 16125.  
High Point Products, 3013 Mary Kay Ln., Glen View, IL 60025.

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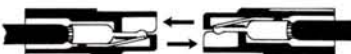
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**ERRATUM** PLEASE NOTE: in the December issue of "Rotary-Wing Roundup," we cited the Hirobo Lama's distributor incorrectly. All HIROBO heli products are distributed exclusively in the U.S. by Altech Marketing, P.O. Box 391, Edison, NJ 08818. (908) 248-8738.

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To satisfy the needs of all fliers—from novices to scale modelers—Hirobo has developed the .30 Lama SA-315B. Its easy-to-assemble, durable Shuttle mechanics make it an excellent performer, and scale modelers will be amazed at Hirobo's attention to detail. The dummy engine has such elements as air ducts, a gear-box and a wiring box, and the scale tail-truss assembly encases the shaft-drive tail-rotor system. For those interested in more realism, the Lama can accept the optional three-blade MRB-III rotor-head assembly, cockpit detail set and exterior engine detail set.

Price: \$675

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08818; (908) 248-8738.

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Stefan Graupner poses with Heim ARF .45

pitch and autorotation. You can use a standard helicopter radio to fly the .45, and starting is done from the bottom with an electric starter. (A starter adapter is included.) The recommended engines are the O.S. Max 46 SF-H and the O.S. Max 32 H.

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# FLOATING AROUND

JOHN SULLIVAN



## AMPHIBIOUS AIRMAIL

ONCE AGAIN, readers have been kind enough to send me pictures of their projects. It's interesting to note that, with the exception of Cubs, Aerostars, Kadet Seniors and Telemasters, in the seven years that I've written this column, I've never received a duplicate project. It just goes to show that you can fly anything on floats!

### THE OLD KAVALIER

First up, this month, is Mike Derman's BB-Fox-.40-powered Sig Kavalier on 32-inch Sullivan\* floats. Mike, who's president of the Red River Flyers of Grand Forks, ND, epoxy/glassed the Kavalier's floats with 6-ounce cloth and sprayed them with Black Baron\* yellow. He uses twin aluminum gear with music-wire spreaders. A control cable that runs to the nose-wheel bearing actuates a water rudder that he built from the Oct. '89 *Model Airplane News* plan.



Mike Derman of Minnesota has flown his .40-powered Sig Kavalier on wheels, skis and 32-inch floats!

The plane was photographed at Mike's uncle's home on Clearlake (no, not that Clearlake) in central Minnesota. Mike is very enthusiastic about floatplanes and enjoys taxiing as much as flying; he has even outfitted the Kavalier with skis for all-weather flying. He's had the plane for some time, yet it appears to be in great condition.

### SKYRAIDER REDO

No sooner had I arrived at the Clearlake '91 meet when a giant-scale Skyraider took to the air. The sound and maneuverability of the huge gas-powered plane was impressive! I had grabbed my camera and was heading for the 1/4-scale ramp, when the pilot attempted to fly a 100-foot loop only 49 feet above the water. The Skyraider looked lost, and I didn't bother with pictures.

Several weeks later, I was talking to a customer, Leon DeLisle, and I discovered that he was the pilot and owner of the ill-fated Skyraider. The crash destroyed 50 percent of the big gasser's wing and 10 percent of its fuselage, so it's repairable. Leon, however, has decided to build a new, improved Skyraider. His 94-inch-span, 84-inch-long bird will be made

(Continued on page 128)

## FLOATING BASICS

Questions about which sizes and types of engine should be used for floatplanes come up a lot. I have a plain-bearing .40 in my Aerostar. Does it provide enough power for floats?—generally speaking, yes. To use it with a plane such as the Aerostar, flat-bottom floats are a must because they're inherently efficient, and they reduce spray. I also recommend that, to minimize weight, you use lightly glassed foam floats or balsa floats covered with MonoKote\*. With these setups, the Aerostar will do just fine. Its takeoffs will be longer, but floatplanes track so beautifully and the runways are so large that this hardly matters. In the air, the Aerostar will lose about 10 percent of its top speed and climbing ability, but the floats' pendulum effect make an already stable plane even easier to fly.

If you power your plane with an upper-range engine, vee-bottoms and a little weight won't hurt anything. As for the type of engine, about 40 percent of the engines that I see being used are 4-strokes, 50 percent are 2-strokes and 10 percent are gas-burners. Although it's really a matter of preference, I'm convinced that 4-strokes have more torque and make great floatplane powerplants. In the event of a "dunking," start the engine, and run it for about 5 minutes. This will heat up the case and the internal parts and completely eliminate the water. Take the valve covers off 4-strokes, and dab any water drops with the corner of a rag.

One last comment—all engines are not created equal, e.g., some .40s barely put out more than a good .25. You have to use your judgement and, if the engine that you're currently using already strains on wheels, don't hope for too much.



This picture of Leon DeLisle's Skyraider was taken early one morning during Clearlake '91. The plane never saw the sun set that day, but Leon is rebuilding.



## FLOATING AROUND

(Continued from page 124)

entirely of glassed foam, and it will weigh considerably less than the 30-pound original. Leon has already completed its pylon float (6-ounce glass over foam), which can support a 250-pound man.

Leon hastened to add that his plane is a Skyraider look-alike by accident. He's a scratch-builder, and his butcher-paper plans are usually used to wipe up a spill or something about halfway through his projects. This type of slam-bang, dream-it-up-as-you-go building is one of this hobby's greatest creative experiences. It's incredibly satisfying, and many people can pull it off long before they think they can.



**It takes two helpers to hold on to Walt Moller's scratch-built Blaum & Voss 138C that's powered by triple Picco .80s! The 38-pound, 114-inch-span aircraft was flown at the Ogopogo '91 Float Fly.**

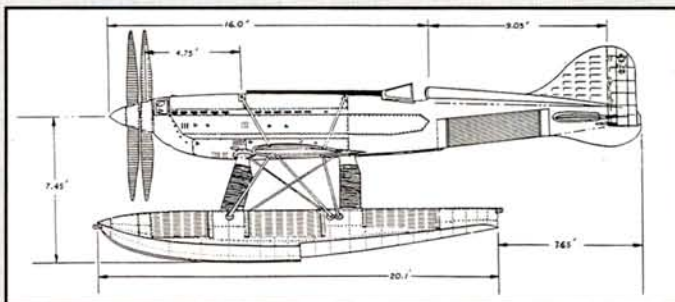
### CANADIAN CORNUCOPIA

About a year ago, I received a Canadian-produced videotape that featured a floatplane meet with some of the finest, most unusual aircraft that I've ever seen. When I reported on the video in this column, I expressed an interest in publishing photos of these planes if someone would be kind enough to send them to *Model Airplane News*. Well, Walter Moller of Surrey, British Columbia, Canada, has been more than kind. He sent a packet, and it was lost. After waiting months without a

## THE SCHNEIDER CORNER

The third Schneider Cup Scale Re-enactment took place on Nov. 1 through 3 at Lake Havasu, AZ. For months prior to it, rumors had circulated that a Macchi MC-72—complete with counter-rotating props—was being built for the event. Bill Caldwell of Dallas, TX, sent me a letter with some particulars. He has a friend who runs a foundry, and this gentleman was involved in building a unit (for a Sachs Dolmer) that incorporates an on-board starter, a motor mount, a gearbox and spinners for counter-rotating props. Fernando Ramos has reportedly built the floats, and others are involved with this project, which is rumored to be coming together in California.

As many of you know, in 1931, the British chose not to wait for the Italians to finish the Macchi, and they hosted the race as scheduled. The Brits won with their Supermarine S-6B, which flew at 340.1 mph. This was their third win in a row, and they retired the Schneider trophy. The Italians protested, but to no avail. Shortly thereafter, the Italians completed the MC-72 and flew the course at more than 430 mph—a sea-level prop-driven world speed record that stands today! The plane's counter-rotating props were driven by a pair of Fiat As-6 powerplants. I'll have more on the new version of this plane in a future column.



**The Macchi Castoldi MC-72 has held the sea-level prop-driven world speed record for 60 years! (Illustration courtesy of Bob Hirsch Scale Plans.)**

word, Walter persevered and sent a second set of photos, some of which I'm presenting this month. The photos were taken at the last annual float fly on Lake Kalamaka, British Columbia, and I'll let them and the captions speak for themselves.

Many of the Canadian meets only officially last two days but, typically, the participants show up a week before the event just to hang out and have a ball. I see cabins and campers in some of the photos, and this leads me to believe that there's plenty of hot black coffee and camp food, as well as late-night campfires, predawn flights, warm sleeping bags and all that good stuff.

Walter also sent a flyer about a float meet

called the Ogopogo '91. It was held on Sept. 7 and 8 at the Crystal Waters Resort, which is just south of Vernon, British Columbia. I've included the name and address of one of the CDs at the end of the column in case any of you roadies out there would like to attend next year. That's all for this month!

*\*Here are the addresses that are pertinent to this article:*

**John Sullivan Model Products**, 1421 Second St., Calistoga, CA 94515.

**Black Baron**; distributed by Coverite, 420 Babylon Rd., Horsham, PA 19044.

**Ogopogo Float Fly**, Charlie Welkie, 2802 16th St., Vernon, British Columbia, Canada V1T 3W9.

**MonoKote**; distributed by Top Flite, 2635 S. Wabash Ave., Chicago, IL 60616.



**Walter Moller of British Columbia, Canada, displays his scratch-built Donier 217KP. The 34-pound, 110-inch-span floatplane is powered by twin ST 2500s.**



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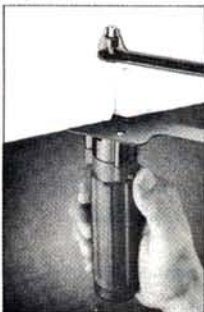
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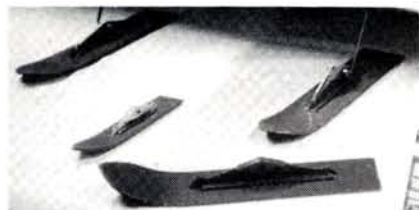


## **JET HANGAR HOBBIES F9F-8 Panther**

This 1/9-scale ducted-fan kit was designed to be used with the Turbax I ducted-fan unit and K&B 9101 (7.5cc) engine. The kit has an epoxy/glass fuselage, a three-piece inlet liner, a fiberglass exhaust liner and pre-seamed epoxy tip tanks, a foam stab, wing-cores and a clear canopy. It also includes three plan sheets and a photo-illustrated instruction booklet that's modified from the F9F-8 Cougar. Wingspan—52 inches; length—56 inches.

Price: \$300

For more information, contact Jet Hangar Hobbies Inc., 12130G Carson St., Hawaiian Gardens, CA 90715; (213) 429-1244.



## **PYRAMID MARKETING GROUP Snow Skis**

Snow skis for your tail-dragger or trike can be mounted directly on your existing landing gear. The bottom of each ski has a two-blade skate that gives positive traction on even the slickest ice. Without the blades, your plane will circle endlessly on ice. The skis are strongly built of durable aircraft plywood to withstand abuse, and the spring-loaded shock absorbers will let your plane "walk" over bumpy ice. Mounting instructions are included for several types of landing gear.

Price: \$30/pair (tail-dragger); \$35/pair (with nose-gear ski), plus \$4 S&H.

For more information, contact Pyramid Marketing Group, P.O. Box 4034, Shrewsbury, MA 01545.



## **TOP FLITE F4U Corsair**

The Top Flight F4U Corsair has been completely redesigned from the ground up. Specifications: wingspan—62 inches; wing area—700 square inches; weight—7 to 9.5 pounds; basic materials—balsa, plywood and clear canopy; recommended power—.60 to .80 2-stroke, .91 to 1.20 4-stroke. The self-aligning fuselage construction makes assembly easy, and the ribbed tail surfaces look realistically fabric-covered. Its concealed linkages, injection-molded ABS cowl and vacu-formed wing air scoops (oil coolers) increase authenticity. Those with moderate building skills will be able to assemble the Corsair easily following the photo-illustrated instruction manual.

For more information, contact Top Flite Models, P.O. Box 721, Urbana, IL 61801.



## **HOBBY LOBBY Simprop Excel**

Here's an unusually light balsa-and-plywood kit. The airframe weighs less than 15 ounces—very light for an 87-inch-wing-span plane—but the wings are stressed to accept a total flying weight of 52 ounces. The Excel's slow, stable flight makes it ideal for beginners, but its construction takes an experienced builder. It soars exceptionally well in light thermals that won't support other sailplanes. Its vee-tail can be removed, so it's easy to transport.

Part no. HLSI0204

Price: \$168

For more information, contact Hobby Lobby International Inc., 5614 Franklin Pike Circle, Brentwood, TN 37027; (615) 373-1444.



## **SEACOAST AEROMATE New Aerocell Flight Pack**

The Aerocell receiver pack has a stable power source, no memory problems and no reverse polarity. It's resistant to vibration and has a long shelf life. It lasts two or three times longer than those unstable Ni-Cds, and it's non-corrosive. Charging is continuous, and there's an auto cut-off charger.

For more information, contact Seacoast Aeromate, 407 Commerce Way #2A, Lake Park, FL 33403; (407) 575-5701.



## **MINICRAFT Precision Drill**

The 15-ounce High Precision Drill Kit features a 100W high-precision drill, a variable-speed transformer, a chuck key and 15 accessories for drilling, cutting, grinding, routing, shaping, sanding and polishing.

Price: \$119.95

For more information, contact Minicraft, 1 Perfection Place, Ridgely, MD 21685; (800) 288-5311.

Descriptions of new products appearing in these pages were derived from press releases by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Model Airplane News, or guarantee product performance. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Model Airplane News.



# PRODUCT NEWS



## STEED'S STUFF

### P-51D Plans and Accessories

These scale plans of the North American P-51D are very accurate, having been drawn from microfilm used in the construction of the full-scale aircraft. Wingspan—92.5 inches; weight—27 to 30 pounds with a 3ci to 4ci engine. Steed'Stuff will soon offer plans, spinner, cowl, canopy, gun ports, complete landing gear, fiberglass fuselage, scoops and scale documentation. All parts are scale replicas made of aluminum, fiberglass, or vacu-formed butyrate. Plans consist of six rolled sheets that have been scaled at 2.5 inches to 1 foot.

For more information, contact Steed'Stuff, Route 1, Box 1360, Hartwell, GA 30643; (404) 376-3012.



## GTM CO. GTM Fuels

If you think you need just a little more oil in your fuel, you'll love "Excalibur," which is 70-percent castor oil and 30 percent synthetic oil. "Wings" is a 15:85 percent castor/synthetic-oil mix. When you buy a gallon of either fuel, you know you're getting the best available ingredients. GTM Co. will mix and match any kind of fuel in pints, quarts, half-gallons and gallons. Fly the GTM way.

For more information, contact GTM Co., P.O. Box 1093, Peoria, AZ 85380-1093; (602) 979-4220.



## SIG MFG.

### Sig Signature Fuel

With nitromethane being in short supply during '91, Sig worked hard to test alternative additives for glow fuel. Sig's Signature R/C Fuel is a nitro-free alternative that offers exactly the same power output, operating temperatures, needle-valve range, and other performance characteristics as the regular Sig Champion 10-percent-nitro fuel. It was tested with the entire spectrum of 2-stroke model engines, and they all ran well. Sig unconditionally guarantees that, when using it, you'll find virtually no difference in performance between using it and regular Champion 10-percent-nitro fuel.

Price: SF-001 (1 gallon), \$11.95; SF-002 (1 quart) \$4.95; SF-003 (1 pint) \$3.25.

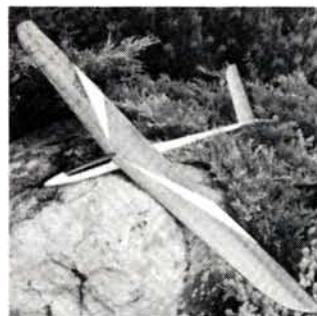
For more information, contact Sig Mfg. Co. Inc., 401-7 South Front St., Montezuma, IA 50171; (515) 623-05154; Fax: (515) 623-3922.



## HOBBY DYNAMICS HD Pilot Figures

Made of soft, durable, latex, these authentic-looking figures are easy to paint with standard enamels. Five sizes are available: 1/9 to 1/4 scale. A pilot is a perfect addition to any aircraft.

For more information, contact Hobby Dynamics Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-0022.



## NORTHEAST SAILPLANE Sparrow and Swallow

The Sparrow is an easy-to-construct, streamlined, vee-tail slope ship with a 65-inch wing of balsa-covered blue foam-core with an SD7080 airfoil (for a wide speed range and excellent slope handling). The kit has an epoxy/glass fuselage with a removable canopy. Control is by means of ailerons and elevator functions. A carbon-fiber wing spar and composite tail features round out the high-tech accouterments of this super sloper. Also available: the Swallow, which has a gray foam vacu-bagged wing, an SD8000 airfoil and a slightly different fuselage.

Prices: Sparrow—\$99.95; Swallow—\$169.95.

For more information, contact Northeast Sailplane Products, 16 Kirby Ln., Williston, VT 05495; (802) 858-9482.



## HANSEN SCALE AVIATION Videos

Video no. 11 covers: the 1991 Northwest International Scale Masters contest at Kellogg State Park in Idaho; preview of Frank Ryder's Aerodrome '92; a tour of Fox Motors Mfg.; a visit with pilot Dan Parsons. Video no. 12 covers the '91 QSAA Quarter Scale meet and the '91 U.S. Scale Masters. VHS.

Price: \$19.95 plus \$3 S&H.

For more information, contact Hansen Scale Aviation Video, 10807 SE Stacy Ct., Portland, OR 97266; (503) 653-2578.



# MODEL AIRPLANE NEWS

## CLASSIFIED

Non-commercial Rate: 15 words or less, \$4.50; additional words, 25¢ each. No charge for name and address. (No commercial ads of any kind accepted at this rate.) Commercial Rate: 50¢ per word (applies to retailers, manufacturers, etc.); count all initials, numbers, name and address, city, state, zip code and phone number. All ads must be paid for in advance. To run your ad for more than one month, multiply your payment by the number of months it is to run. Deadline: the 10th of the third preceding month (e.g., January 10 for the April issue). We don't furnish box numbers, and it isn't our policy to send tear sheets. SEND AD AND PAYMENT TO: CLASSIFIED ADS, MAN, 251 Danbury Rd., Wilton, CT 06897 ATTN: Laura Kidder

**BERKELEY, CLEVELAND, ETC.,** replica kits, duration rockets for jet models. Send three stamps to: WILLAIRCO, 2711 Piedmont Rd. NE, Atlanta, GA 30305.

**WANTED:** Model engines and race cars before 1950. Don Blackburn, P.O. Box 15143, Amarillo, TX 79105, (806) 622-1657.

**1930s to 1950s MODEL AIRPLANE MAGAZINES;** 1930s aviation pulps, complete and good condition; \$1 for list. Bruce Thompson, 328 St. Germain Ave., Toronto, Ontario, Canada M5M 1W3.

**START YOUR OWN HOBBY SHOP** or buy for friends or group; 30 to 60 percent off. For information, send \$1 and no. 10 SASE: R&L HOBBIES, 10334 Portage Rd., Portage, MI 49002.

**WANTED:** kits from 1950s and '60s, especially: Monogram, Berkeley, Speedee-Bilt, Babcock, Veco, Scientific U/C, deBolt, Top Flite, Taurus and Tauri. Dr. Frank Jacobellis, 15 Highland Park Pl., Rye, NY 10580; (914) 967-5550.

**HELICOPTER SCHOOL**—5 days of hands-on instruction with X-Cell helicopters and Futaba computer radios. Small classes tailored to your individual needs. Beginner to expert. Includes all meals and lodging. Over 160 satisfied students and 5,600 flights logged. Located on a 67-acre airport used exclusively for R/C training; owned and operated by Ernie Huber, five-time National Helicopter Champion and helicopter designer. Send for free information and class schedule now! R/C FLIGHT TRAINING CENTER, P.O. Box 727, Crescent City, FL 32112-727, or call (904) 698-4275 or Fax (904) 698-4724.

**GIANT SCALE PLANS** by Hostetler. Send SASE to Wendell Hostetler's Plans, 1041 B Heatherwood, Orrville, OH 44667.

**R/C WORLD—ORLANDO, FL, CONDO RENTAL**—2 bedroom, furnished. Available weekly or monthly. Low rates, 100 acre flying field with enclosed hangar. Swimming pool, tennis courts on site. Minutes from Disney World and Epcot Center. For information, call Michelle, (800) 243-6685, or write to Air Age, Inc., Condo Dept., 251 Danbury Rd., Wilton, CT 06897.

**WANTED:** Model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649.

**WANTED:** Berkeley and Cleveland kits or related items: parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc. Gordon Blume, 4649-191st Ave. S.E., Issaquah, WA 98027.

**ANTIQUE IGNITION AND GLOW PARTS CATALOGUE:** 100 pgs., timers, needle valves, original cylinder heads, point sets, drive washers, stacks, spark plugs, plans. Engines: Atwoods, Baby Cyclones, McCoy's, Hornets, others. \$8 postpaid U.S., Foreign \$20. Chris Rossbach, R.D. 1 Queensboro Manor, Box 390, Gloversville, NY 12078.

**SCALE MODEL RESEARCH** Aircraft Documentation. World's largest. Over 3,000 different Foto-Paaks and 10,000+ drawings. Catalogue \$4. 2334 Ticonderoga, Costa Mesa, CA 92626 (714) 979-8058.

**INTERNATIONAL AIRCRAFT RESEARCH**—Need documentation? Include name of aircraft for availability of documentation with \$3 for 3-view and photo catalogue. 1447 Helm Crt., Mississauga, Ontario, Canada L5J 3G3.

**OLD-TIMERS,** take a ride back in time to airplane modeling roots with this vintage book—*Gas Models*. A true collector's book from the early editors of *Model Airplane News*, it contains the best of modeling from the '30s and '40s, including great technical information and classic construction articles from the Golden Age period. \$7.95, add \$2.95 S&H for first item; \$1 for each additional item. *Foreign:* (including Canada and Mexico)—*surface mail*, add \$4 for first item, \$2 for each additional item; *airmail*, add \$7 for first item, \$2.50 for each additional item. Payment must be in U.S. funds drawn on a U.S. bank, or by international money order. Connecticut residents add 8% tax. Air Age Mail-Order Service, 251 Danbury Rd., Wilton, CT 06897.

**WANTED:** Old unbuilt plastic model kits. Planes, military, figures, cars, promos. Aircraft or missile desk models. Send list, price. Models, Box 863, Wyandotte, MI 48192.

**R/C HELICOPTER TRADER.** Published every other week. Helicopters, parts and accessories. For free copy, send SASE to P.O. Box 702, Arlington, TX 76004.

**ENGINES: IGNITION, GLOW, DIESEL**—new, used, collectors, runners. Sell, trade, buy. Send \$2 for large list to Rob Eierman, 504 Las Posas, Ridgecrest, CA 93555. (619) 375-5537.

**NEW: SOCKET-HEAD SHEET-METAL SCREWS**—no. 4x1/2 @ \$5.45/100. Metric M3.5x15mm socket cap screws for Super Tigre @ \$4.40/20 (all orders add \$3.50 S&H). For free catalogue, contact: Micro Fasteners, 110 Hillcrest Rd., Flemington, NJ 08822; (908) 806-4050.

**PLANS ENLARGED**—Aviation art, plotting service, model software. Free information. Concept, P.O. Box 669E, Poway, CA 92074-0669; (619) 486-2464.

**BALL BEARINGS**—chrome steel; in stock to fit most model engines; metric or standard; Fox, K&B, O.S., OPS, Webra, YS. SASE: REVMOR, P.O. Box 548, Palm City, FL 33490; (407) 283-6831, after 5 p.m.

**P-38! COLUMBIA MODEL WORKS** is now offering a full kit for its giant-scale P-38. Scale and sport-scale versions are available with 95-inch and 105-inch spans, respectively. This balsa-and-ply kit builds into a spectacularly flying fully aerobatic model. Demonstration flights available for those traveling through our area. Kit price: \$495. For info pack, send \$1 to: Columbia Model Works, 3411 Sherwood Dr., Columbia, MO 65202, or call (314) 474-3285.

**COMPUTERIZED AIRCRAFT PLOTS:** Technical illustrations suitable for framing. Three-views. Computer scale drafting and scanning services. Turn out prints into masterpieces! Catalogue, \$1. D-TECH SYSTEMS, Rte. 2, Box 191-14, Cartersville, IL 62918.

**WANTED:** I will buy your old, outdated R/C systems. Ron Gwara, 21 Circle Dr., Waverly, NY 14892. Tel.: (607) 565-7486.

**ATTENTION!—LEARN TO FLY!** Experts and novices are presented six learning sessions structured in a unique VHS format using innovative instruction methods and rules of flight. Each session has been thoroughly refined over two years by a professional R/C pilot. Excellent supplement to club training programs; \$14.95/session plus \$4 P&H. Other new R/C products also available. Catalogue, \$2 (refunded with first purchase). Cash, check, Visa, or MC. SILICON VALLEY R/C TECHNOLOGIES, (800) 822-1500.

**R/C HOBBY SHOP/GAME ROOM**—health forces sale. Asking \$73,000, which is in inventory and fixtures. Jasper, TN (615) 942-4035/942-3703.

**READY-TO-FLY R/C AIRCRAFT**—will build any .20 to 1/8-scale aircraft. Built to your specifications. Over 12 years in the hobby business; first-class workmanship; very reasonable rates. BOWENS' AIRCRAFT MFG., Rt. 1, Box 107, Baring, MO 63531; (816) 883-5780.

**MODEL AIRPLANE NEWS** for sale, '33 to '91; *American Modeler* and *Model Builder*, '60 to '90. For list, SASE (long), Milton Sheppard, 670 Concord Rd., Glen Mills, PA 19342.

**WHAT A BARGAIN!**—found in heated warehouse: 84 brand-new, all-balsa "Cutlass Supreme Mk II" deluxe kits designed by Don Lowe and produced by Mini-Flite Co. of NJ in 1973. The 64-inch tapered-span kits are complete with die-cut balsa, spruce spars, full hardware packages, etc., and full-size plans with details for optional retracts. The balsa alone is worth the price! *Once in a lifetime buy* at \$59 each plus \$15 shipping. First come basis. *Special for clubs or groups:* four kits shipped in one carton for \$215 PP in the U.S. Money order or bank check or, to order picture and specs, an SAE to: Fred Angel, 33 Boston Tpk., Shrewsbury, MA 01545; (508) 754-4197.

**CAPS, PATCHES, JACKETS** all types of custom embroidery; 3-inch patches, 150 pieces at \$3.25 each. Embroidered caps from \$5 to \$15. More than 3,000 stock logos. Embroidered jackets, \$70 and under. Contact Creative Sportswear, P.O. Box 158, Oley, PA 19547; (800) 444-9016.

**THREE VIDEOS!!** *Airpower 1930-41, Aircraft Carrier History and Air Force Potpourri*. About 1 hour each; \$13.50 per tape plus \$3 S&H (U.S.); VHS or Beta. Send check or money order to Sheryl Video Co., Dept. MAFEB, 926 Iroquois Ave., Livermore, CA 94550.

**HALL "BULLDOG,"** Gee Bees, Monocoupe, etc. Ultimate "proof of scale" plans by Vern Clements, 308 Palo Alto, Caldwell, ID 83605. Extensive catalogue/news, \$3.

**NEW (4-INCH) HORNER** twin; silent-spark ignition, coupled timing, plugs; test run. \$410 including P&H. Limited quantity. Al Diem, (801) 298-7254.

**DESERT STORM TECHNOLOGY** comes home!!! *Live action video* from your plane, heli, sub, etc.; 2.2-ounce micro videocam makes it possible! Under \$200!!! Video transmitters, how-to videotapes and more. Send \$2 for catalogue to: SUPERCIRCUITS, 1403-B Bayview, Hermosa Beach, CA 90254; (213) 372-9166.

**FOR SALE**—Kalt Baron Whisper electric helicopter in brand-new condition with all original parts. All set to fly with lots of extras included. Asking \$375. Call or write to Frank Voci, 50 Woodvale Loop, Staten Island, NY 10309; (718) 984-5971.

**IMPORTED DIESEL ENGINES**—AE, Aurora, Cipolla, D-C, KMD, MAP3, MIKRO, MK, MVVS, PAW, Pfeffer, Silver Swallow and USE. Also replica Letmo, Mills and MOVO diesels and rare imported glow engines and CO<sub>2</sub> motors. Ten-page catalogue, \$1. CARLSON ENGINE IMPORTS, 814 E. Marconi, Phoenix, AZ 85022.

**ANTIQUE MOTORS**—O/R .29, Torpedo .35, ThimbleDome .049, McCoy .19. Also, I'm a model builder. Will build complete model or helicopter or any part. Call (201) 489-4189. Ask for Ted.



# CLUB OF THE MONTH



## VALLEY R/C MODEL CLUB

605 Stevenson St., Sayre, PA 18840

If the number of smiles you see at a flying field is a good way to measure a club's success, then the Valley R/C Model Club of Sayre, PA, must be pretty successful. Secretary Danny Luchaco sent in six issues of the club's newsletter—the Valley Flyer—and the photos in each reflect a fun-loving group of modelers.

In the most recent issue, Danny's report on their 19th Annual Valley R/C Fun-Fly Contest was complete with photos and a winners' list. The detailed report described each event, named the winners, and included points or official times posted. If he had added a few color photos, it would have made a nice feature article for *Model Airplane News*!

Other interesting articles included information on engine break-in procedures, engine starting tips and care and maintenance tips for engines. Also included were a club membership list and a letter from the Athens Township Supervisors thanking club members for their exemplary conduct during the fun fly at the town park. The letter went on to say that the club was welcome back at any time. This is great PR, considering that other clubs are having problems finding and keeping their flying sites. Keep up the good work, Valley R/C Model Club members.

We're sending you two one-year subscriptions to *Model Airplane News*. Congratulations.

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#RED 05	Marine Navigation Lights (nonflashing) 9V	\$10.95
#RED 06	Sky Lights, 18 Light Set, 9 V	\$24.95
#RED 14	Big Airplane Navigation Lights 9V	\$24.95
#RED 16	Econo Landing Lights (the brightest!) 9V	\$19.95
#RED 23	Real Strobe Light (a true xenon strobe) 3V	\$29.95

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# NAME THAT PLANE

## CAN YOU IDENTIFY THIS AIRCRAFT?

If so, send your answer to Model Airplane News, **Name the Plane Contest** (state issue in which plane appeared), 251 Danbury Rd., Wilton, CT 06897.

Congratulations to Jack Brower of Chula Vista, CA, for correctly identifying our mystery plane in the November issue.



Jack's entry was drawn from the 16 correct entries that we received. The Rohrbaugh R.O. III was a large twin-engine monoplane flying boat designed for overseas air reconnaissance. It had a wingspan of 95 feet, 3 inches and a length of 54 feet, 2 inches. It weighed 12,550 pounds loaded, and it was powered by two Rolls-Royce Eagle IX, 360hp engines. The cockpit just forward of the wing's leading edge housed the pilot and the copilot side by side,

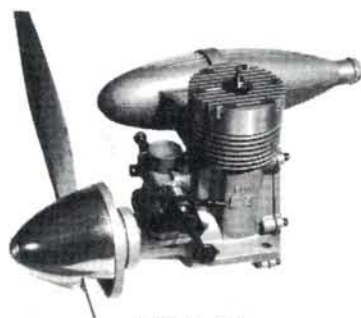


and a nose gunner sat at the extreme bow. Another open-air cockpit was located aft of the wing's trailing edge. Sails, masts and rigging were stowed aboard, in case the plane went down at sea. The R.O. III performed remarkably well when it was tested at Copenhagen, Denmark, and the Japanese Navy ordered several.

The winner will be drawn four weeks following publication from correct answers received (on a postcard delivered by U.S. Mail), and will receive a free one-year subscription to **Model Airplane News**. If already a subscriber, the winner will receive a free one-year extension of his subscription.

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KRAFT			61	61
MAGNUM	21-25	40-45		40-44-45
MERCO	30-35	40	50-61	40-61
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O.S. MAX	15-35	40-50	60-90-108	60-61-108
PICO				90
ROSSI		40	61	61
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SKYWARD	25-28	40-46	61	40-46-61
SUPER TIGRE	20-23	34-40-46	51-60-90-2000	40-45-46-51
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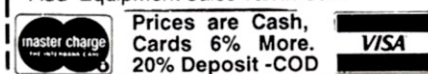
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## FUN-ONE

(Continued from page 118)

In the air, the Fun-One is a blast. The heavily reinforced wing proved itself as I put the plane through the wringer. Later flights showed that it could be yanked off the deck quickly, owing much to the engine's power.

The Focus 6 radio and the ASP .32 ABC engine make a good package. An experienced sport pilot could easily handle this plane, and a hot-roddin' power-hungry pilot could stick a hot .40 up front and really burn up the sky. The Fun-One is built to take it all. This could be the sport plane that you'll end up taking to the field every weekend.

\*Here are the addresses of the companies mentioned in this article:

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61824.  
ASP/ISC International Trading Co., P.O. Box 40116, Indianapolis, IN 46240.  
Hitec/RCD, Inc., 9419 Abraham Way, Santee, CA 92071.  
APC Composite Propellers; available at most hobby shops.

## SPORTEE 40

(Continued from page 84)

I painted the pants and the engine compartment with Hobbypoxy\* paint. To finish, I simply had to install the ASP\* .40 engine and the 7-channel Futaba\* radio system with S-148 servos. I achieved the correct balance point with the radio equipment using the position shown on the plans. The plane's total weight is 10 ounces more than the recommended 4-pound target.

Since its first flight, the review model has logged many flights that have confirmed its ability to perform maneuvers in a respectable fashion. In general, the shortcomings in the kit are offset by the model's slick appearance and superb flying characteristics. The Hobby Dynamics Sportee 40 will probably satisfy the needs of most sport fliers.

\*Here are the addresses of the companies mentioned in this article:

Hobby Dynamics Distributors, 4105 Fieldstone Rd., P.O. Box 3726, Champaign, IL 61826.  
Carl Goldberg Models Inc., 4732 W. Chicago Ave., Chicago, IL 60651.  
Art Gross Enterprises, 12516 Maplewood Ave., Edmonds, WA 98026.  
Sullivan Products Inc., P.O. Box 5166, I N. Haven St., Baltimore, MD 21224.  
SonicTronics Inc., 7865 Mill Rd., Elkins Park, PA 19117.  
Top Flite Models Inc., distributed by Great Planes Model Distributors, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.  
Hobbypoxy Products, Div. of Pettit Paint Co. Inc., 36 Pine St., Rockaway, NJ 07866.  
ASP; distributed by ISC International, P.O. Box 40116, Indianapolis, IN 46240.  
Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.  
Master Airscrew; distributed by Windsor Propeller Co., 3219 Monier Cir., Rancho Cordova, CA 95742.  
Oracover; distributed by Hobby Lobby International, 5614 Franklin Pike Cir., Brentwood, TN 37027.



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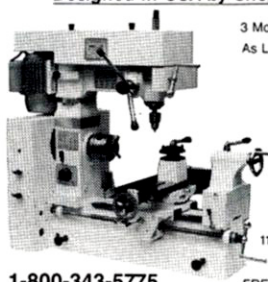
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### SKYBURNER

(Continued from page 29)

hole in the end to accept the ball driver that comes with the Dynamax. Cut a piece of 1/4-inch-diameter (inside) brass tube, and slide it over the shank. Cut a 1/4-20 thread in the solid end, and use two 1/4-20 nuts to secure a 1 1/2-inch-diameter plastic spinner.

#### FLIGHT

Flying the Skyburner is a satisfying experience. The plane has excellent ground handling capabilities. With a .61 engine, it can lift off from mowed grass in 40 yards (without a head wind); a .77 will shorten the takeoff run to about 30 yards.

During the past two summers, my plane has proven itself to be a reliable, consistent performer. The jet is very stable at any speed—from above a stall to full-wide open. I estimate its top speed to be 120mph with a .61 engine and 140mph with a .77.

With the .77 engine, the aircraft will climb straight up till it's only a small speck in the sky—true Top Gun performance! On the other end, the plane displays good low-speed handling, including a good glide ratio. The plane is also the mother of all leaf-blowers!

This plane generates a tremendous amount of interest at my local flying fields. I've returned home late more than once after standing around answering questions and talking about ducted fans with fellow modelers. This is what R/C is all about.

I hope you have as much fun building and flying the Skyburner .60 as I've had. What will I do next? No, I'm not going to Disney World; I'm designing and building a Skyburner .45!

*\*Here are the addresses of the companies mentioned in this article:*

**Sullivan Products**, 1 North Haven St., P.O. Box 5166, Baltimore, MD 21224.

**Jet Model Products**, 304 Silvertop, Raymore, MO 64083.

**Ace R/C Inc.**, 116 W. 19th St., Box 511C, Higginsville, MO 64037.

(Continued on page 138)

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All models use .40 2C engines and feature a fiberglass fuselage with pre-joined halves. The kits include vacu-formed cowls and nacelles. The wings and empennage are made of small-bead, low-density foam and are pre-slotted for the spars. The kits feature pre-sawn spars, and all wood is included to build the planes. Retractable landing-gear kits are available for the Canadair and the Albatross. The 120-minute video covers building and flying. The kit comes with a 35-page construction manual with step-by-step instructions and detail drawings. Retractable landing-gear kit \$179.95; Video \$24.95. G&P Sales 410 College Ave., Angwin CA 94508 (707) 965-3866 CA Residents add 6.25% sales tax. Please send \$1.00 for information sheet.

## SKYBURNER

(Continued from page 137)

**MonoKote/Great Planes Model Dist.**, 1608 Interstate Dr., P.O. Box 4021, Champaign, IL 61824.

**O.S./Great Planes Model Dist.**

**Rossi USA**, 214 Harvest Ave., Staten Island, NY 10310.

**Picco Engines**; imported by Tidewater Engineering, 2406 W. Madison Ave., P.O. Box 1135, Bastrop, LA 71220.

**Webra**; distributed by Hobby Dynamics Dist., P.O. Box 3726, Champaign, IL 61826.

**OPS**; distributed by Shamrock Competition Imports, P.O. Box 26247, New Orleans, LA 70186.

[Editor's note: for low-cost balsa and plywood, the author recommends Balsa USA, P.O. Box 164, Marinette, WI 54143.]

## MOTORS MOTORS MOTORS

The folks at Model Tronics have spent a great deal of money and time to find the best .05 aircraft motors for the price. All of our motors are ball bearing types and have replaceable brushes and adjustable timing. They come with instructions on how to adjust timing and take care of the motor. All of them are high RPM motors designed for gear-box use ONLY. The Super Sport model has excellent power while giving very good flight times. The Sport Combat model has more power and good endurance and can power Psycho Max VERTICAL for quite a ways. The COMBAT motor will give more vertical performance, but will reduce flight times unless you use the throttle in reduced power settings as much as possible. The War Emergency Power motor will give unlimited vertical to Psycho Max and good endurance due to its special armature and new magnet material. Send \$1.00 for your catalog. A video tape of models in action is available (45 min.).

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